AUGUST 15, 1955

STEEL
The Metalworking Weekly

Business Consultants:
Their Uses and Limitations

Our work is 60 per cent human relations, 40 per cent technical knowledge, says consultant Robert Heller
—page 123

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NEW LIGHTWEIGHT EC&M 55" MAGNET*

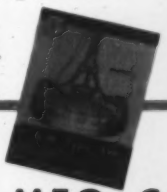
- HANDLES LIGHT SCRAP AT LOWER COST
- WEIGHS UP TO 25% LESS WITH COMPARABLE LIFTING CAPACITY
- FASTER OPERATION OVER WIDER WORKING RADIUS

* Companion to the EC&M 45" Lightweight Magnet

This new magnet, developed by EC&M engineers, is the lightest weight 55-inch magnet. High strength and water-tight construction are maintained with a completely ALL-WELDED design. Elimination of bolt-head recesses allows a better proportion for coil space, giving high lifting capacity. Welding also keeps pole shoes tight.

Introduced less than a year ago, the EC&M lightweight 45-inch magnet has already become popular because its faster maneuverability and greater working radius permit more trips per day. The new 55-inch magnet incorporates the same profitable advantages. Get the facts . . . and note how these lightweight magnets can cut your light scrap handling costs.

Write for Bulletin 900-L



6522

THE ELECTRIC CONTROLLER & MFG. CO.

4498 Lee Road • Cleveland 28, Ohio

Mayari R makes it lighter... stronger... longer lasting

How Mayari R gave extra strength to these 75-foot Van-Cars

These new Van-Cars,* each 75 ft long, are carrying trailers in the new "TrucTrain" service that the Pennsylvania Railroad has inaugurated, with The Rail-Trailer Co. acting as coordinator between the railroad and motor common carriers.

Because of the unusual length of these cars they had to be extra-strong between bolsters, yet without excessive weight. For this reason, load-bearing members such as center sills, side sills, stringers and crossties were built of Mayari R high-strength, low-alloy steel. With half again the strength of carbon structural steel, these and other Mayari R members supplied ample strength while holding the weight down to 79,000 lb per car.

More and more Mayari R is becoming the choice for railway cars and motive power, automotive vehicles and trailers,

*Van-Car Corporation, which owns these cars, is the car-leasing subsidiary of The Rail-Trailer Co.

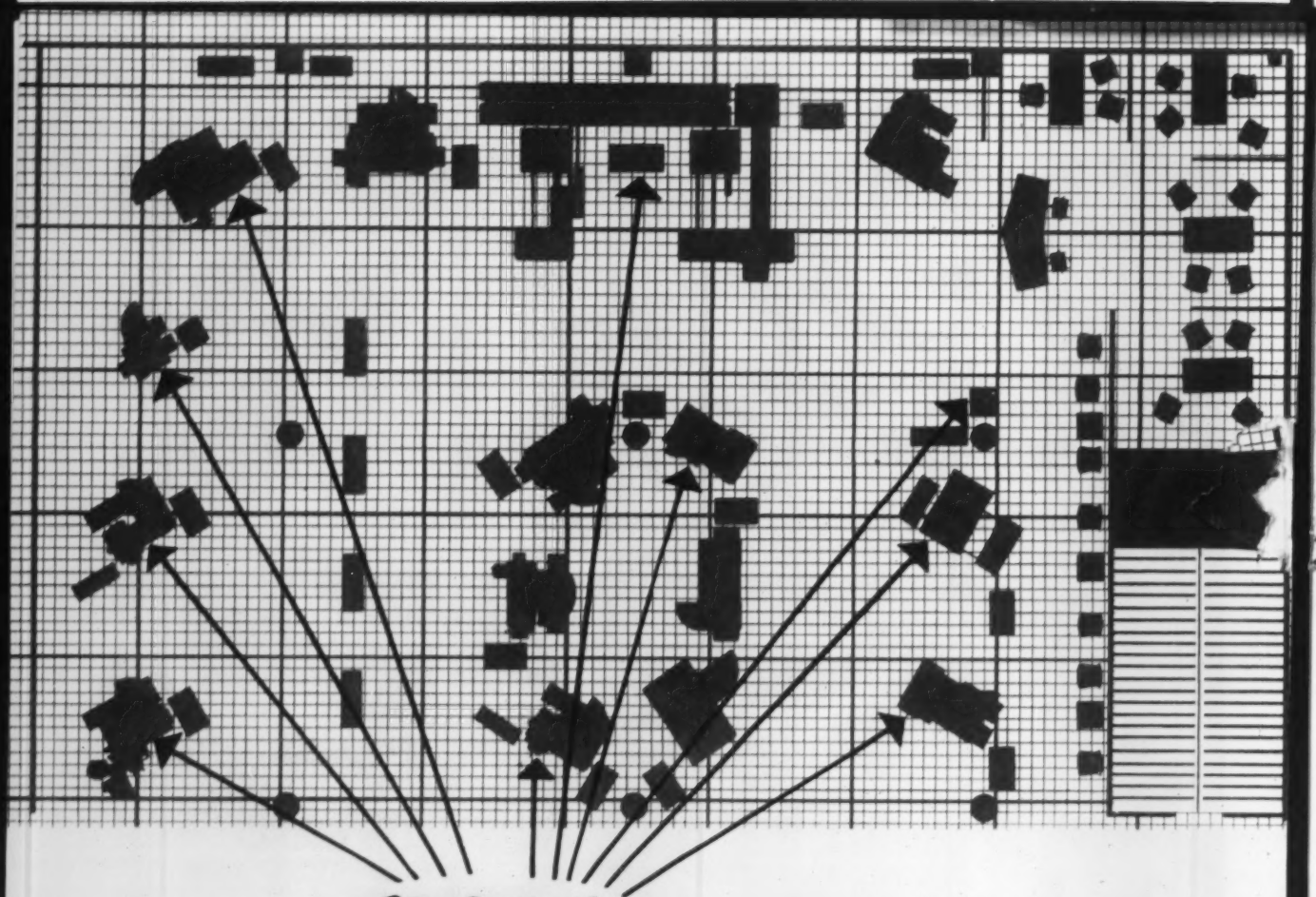
These specially-designed cars are 75 ft long, have a capacity of 125,000 lb. Hinged ramps at car ends allow end-loading in strings.

as well as a host of industrial applications. It is readily welded and worked, and holds paint up to 80 pct longer than plain carbon steel. Catalog 353 shows dozens of outstanding applications of Mayari R, some of which probably have a bearing on a problem confronting you. A phone call or note will bring you a copy promptly.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL



these new Heald developments are TOP SECRET now

THE SIXTEEN Heald machines shown in the above floor plan of Booth 902, represent the very latest advances in modern precision-finishing methods and equipment.

Some of these machines are completely new—never before shown to the industry. Others demonstrate outstanding new developments and improvements that will mean faster, better production of precision-finished parts. All machines will be in operation, on appropriate work.

Here you will see new machines with mechanical cycling—new automatic sizing methods—new self-adjusting grinding cycles—new wheel dressing procedures—new after-gaging and feedback systems—a fully automated multi-unit borizing setup—and a completely new angle in Bore-Matic design.

This is real progress in precision finishing—progress that means a new, higher return on "the world's best investment, in action".

...but you are invited to see them all, IN ACTION, in Booth 902 at the Machine Tool Show

IT PAYS TO COME TO HEALD

THE HEALD MACHINE COMPANY
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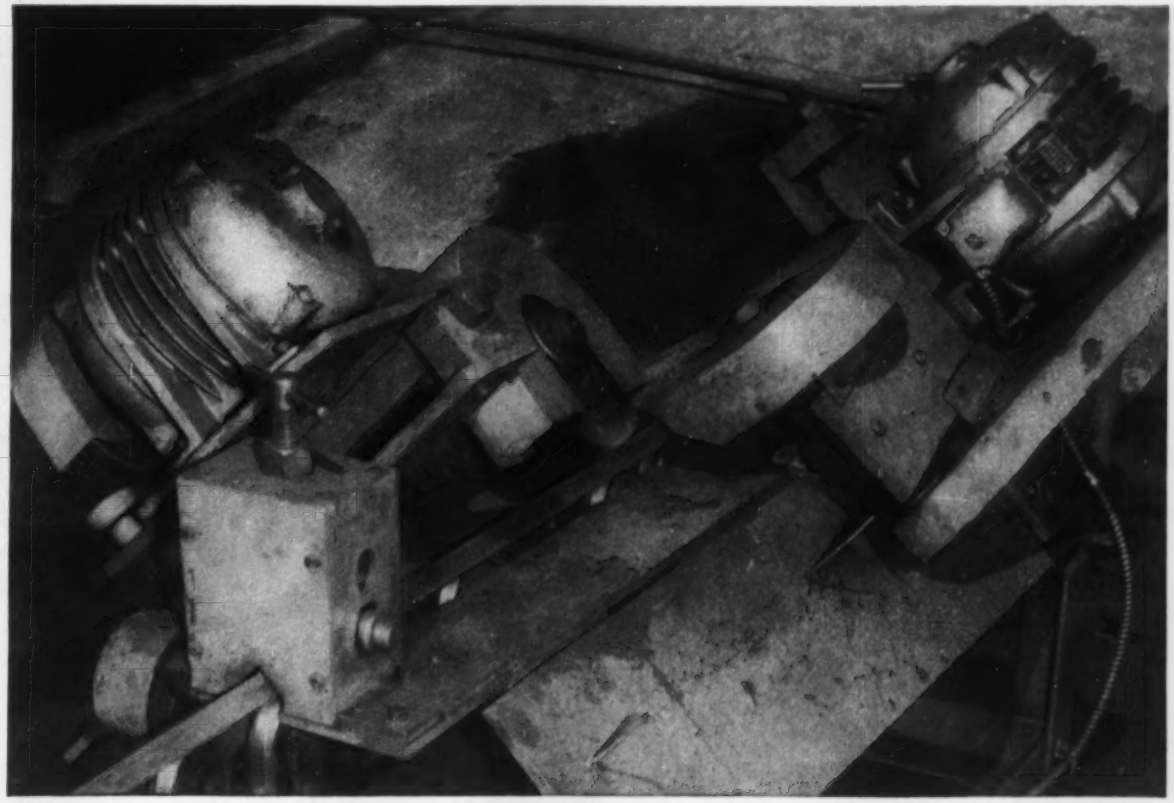
HEALD



FAST PASS STRIPS SCALE

to save money on material!

A cost-reducing idea an OBA can duplicate in your plant

This manufacturer takes advantage of a price differential by buying a grade of angle iron that still has mill scale on it.

The Problem: How to remove this hard scale and still save money over purchasing a more costly grade of steel that has been pickled.

Here's what they do: The angle iron bars are fed through a simple brushing machine against two Osborn Master® Wheel power brushes. In one pass, these Osborn Brushes effectively remove the hard, flint-like scale . . . at a rate of 150 feet a minute.

The strips come clean, ready for production.

You benefit many ways by having an **O**sborn **B**rushing **A**nalysis made of your cleaning and finishing operations. You can improve the quality of your product, automate your methods and cut manufacturing costs. Write us about an **OBA.** *The Osborn Manufacturing Company, Dept. G-35, 5401 Hamilton Ave., Cleveland 14, Ohio.*

BEFORE BRUSHING
Steel strips are covered with hard mill scale.
AFTER BRUSHING
Scale is gone. Surface is clean, ready for use.

Osborn Brushes

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

MIDVALE FORGES 7-TON GEAR RIM

Checking tooth contact on low speed gear, after being cut from Midvale forging. (Photo: General Electric)

Official U.S. Navy photo

For Seven Seas Service

Moving 60,000-ton ships is no job for weaklings. It takes real power . . . lots of it . . . and machinery strong enough to transmit that power to whirling propellers.

Rims for four low-speed gears, used in the General Electric Company's propulsion units totalling more than 200,000 HP (enough to furnish electricity for a city of 1½ million people) for the aircraft carrier USS SARATOGA, were forged by Midvale to convert that power into motion. Rough machined, each weighed 15,640 lbs., approximately, but each required a 73,500 lb. ingot to have a heart big and tough enough for the job.

Inherent alloy strength was developed by proven heat treatment to meet requirements for strength and wear. Machining was supervised by craftsmen with the experience and equipment to handle rough or finish machining of virtually any size.

Careful workmanship . . . in steel making, forging, inspection, machining . . . has earned for Midvale forgings, over nearly fifty years, their reputation for excellent performance and long life.

When you need any forgings . . . gear rims and pinions, rolls, shafting (machinery and ship propulsion), pressure vessels or a variety of other custom steel products . . . call Midvale.

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Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, FLANGES, CORROSION AND HEAT RESISTING CASTINGS

STEEL
The Metalworking Weekly

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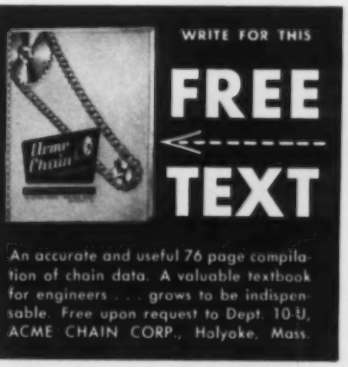
Editorial & Business Staffs, 16. Advertising Index, 214. Editorial Index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 W. 39th St., New York 18, N.Y.

Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, O. Subscription in the United States and its possessions, Canada, Mexico, Cuba, Central and South America, one year, $7.50; two years, $15; all other countries, one year, $20. Single copies (current issues), 50 cents. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland. Copyright, 1955, The Penton Publishing Co.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An accurate and useful 76 page compilation of chain data. A valuable textbook for engineers . . . grows to be indispensable. Free upon request to Dept. 10-U, ACME CHAIN CORP., Holyoke, Mass.

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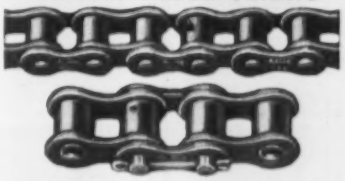
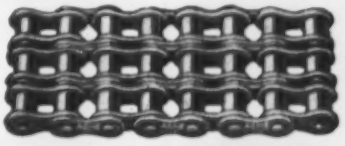


STANDARD ROLLER CHAINS
Available in pitches from ⅜" to 2½" riveted and detachable type.



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Multiple widths of six strand or wider available for special application.

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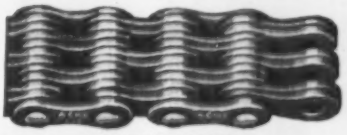
For use in slower speed power transmission and material handling conveyors.



CABLE CHAINS
Acme Cable Chains are furnished in a variety of pitches, widths and strength.

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Acme Sprockets are available in a wide range of sizes, in all types.

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Quality Gears for over 60 years

behind the scenes

Ye That Have Ears To Hear . . .

A workman sent to inform an unfortunate woman that her husband had been killed didn't believe in beating about the bush. "Good day, lady," he began, tipping his hat politely. "Are you the widow Geohagan?"

If all writers and speakers were that direct, there's no telling how much time would be saved by a world panting to be informed. Getting to the point at once is a commendable art—and an artist in this connection is Dr. Clyde Williams, president and director, Battelle Memorial Institute, Columbus, O. In an editorial that appeared in the July, 1955, issue of *The Battelle Review*, a monthly magazine published by the institute, Dr. Williams wrote:

"The chief function of the trade or business journal is, of course, to inform. They present news, instructive articles, economic and technical data and the reflected views and opinions of thought leaders in the sections of industry or commerce they serve. The advertising columns that support these publications—important also as sources of information—are the showcases of the products and services of interest to businessmen. . . They are important chronicles of technology to productive people. They take over where the scientific pournals leave off and interpret scientific advances to the people capable of, and interested in, applying it."

Thank you, doctor. We've always wanted to say it like that but we couldn't assemble the words.

Reprint Deluge

On July 25, STEEL published an article entitled "What Cost Price Fighting?" The response was amazing. So far there have been more than 200 requests for nearly 8000 copies of the article. Price, apparently, is a subject that snuggles close to the human heart, and any trembling in the one seems to affect the other. The paradox of price wars in the midst of unparalleled prosperity has shaken management, and puzzled it as well. The clamor for reprints suggests that price fighting is going to come in for a wide and comprehensive examination by metalworking management.

Transformation of Consultants

If you were a businessman in ancient Greece and you wanted to hire a little business consultation, you'd walk up to a punchy priestess seated on a tripod over a chasm from which a peculiar exhalation was supposed to issue, and listen attentively. After a bit, the lady would rock and roll until she got really sent, Jack, and then you would receive your advice in double talk, eight to the bar.

The oracles of today are great improvements on those of antiquity. Today's oracles are consultants, and there's a knack in selecting them. STEEL's program for management story on page 123 concerns consultants, their uses and limitations. If you're on the lookout for professional advice on industrial, economic, management or laboratory problems, check this article before you hire services helter skelter.

Burjevsky's Cone

The fifth power of 61 is 844596301.

Some of the hot shots in the puzzle corner have been complaining about our simple problems. Here's one that should be illegal. A Russian scientist, Franik Burjevsky, escaped to Siberia, bearing with him a solid cone of jzxcvbiop, a strange Siberian chemical that remains inactive unless exposed to the night sun; then it retains its shape, but loses its volume through evaporation at the rate of 5.2 cu in. per hour per square inch of exposed surface. Burjevsky accidentally exposed his jzxcvbiop at 10:30 p.m., and it remained in the sun until 2:15 a.m., when Franik awakened in alarm and absently knocked off the top third of the cone. The new cone had a base area of 5½-sq in., and the base angle was 65 degrees. How tall was the cone before it was exposed to the night sun?

Shrdlu

(Metalworking Outlook—Page 77)

200-FT. PICKLING TANK HAS A SEAMLESS U. S. PERMOBOND LINING

Designed for the continuous pickling of strip steel up to 80″ maximum width, this tank in the Irvin works of U. S. Steel Corp. is over 200 feet long and 20 feet wide. It is lined with United States Rubber Company's protective PERMOBOND® Lining.

Today's ever-increasing production requirements call for longer and larger pickling baths that must be lined on the job. In this instance 5 individual sections lined at the "U. S." Fort Wayne plant were shipped to the customer's mill. There "U. S." field crews "bandaged" the welded sections and vulcanized them to make one continuous lining with no seams or joints.

"U. S." sales engineers will consult with you about any corrosion problem for new or existing processing equipment.

GET IN TOUCH WITH THEM AT THE ADDRESS BELOW.

"U.S." Research perfects it...

"U.S." Production builds it...

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you can
SAVE TIME
and
MONEY
on
jobs like this
with
the

...GISHOLT SPEED SELECTOR!

HERE'S WHY:

No manual gear shifting! You simply turn this hand wheel or touch a trip lever (for Direct or Pre-set operation). Shifting is automatic—by hydraulic power—while the operator positions the new tools for the next cut.

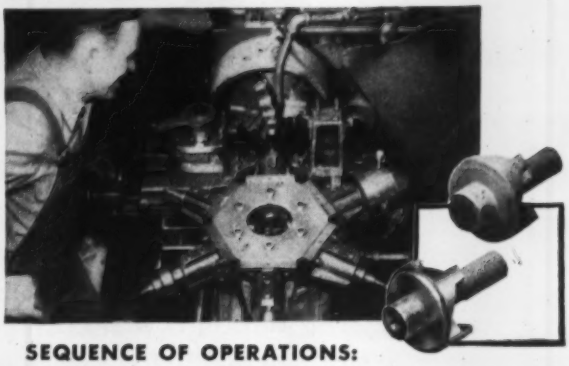
It's all so much simpler with the Speed Selector. There's no need for time-wasting computations, no mental effort, no physical effort. With simple controls, either direct or prearranged, the operator gets the ideal f.p.m. cutting speed for each cut. And it's *much faster,* of course!

The Speed Selector is standard on Gisholt Nos. 4 and 5 Ram Type Turret Lathes and on all Gisholt Saddle Type Lathes.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

HERE'S HOW:



SEQUENCE OF OPERATIONS:

Note the star which indicates each time the Speed Selector is used.

★ **1. Hexagon turret—Center drill at 297 r.p.m. hand feed**

2. Hexagon turret—Support with live center

★ **3. Square turret—Rough turn and face at 96 r.p.m., .003 feed**

★ **4. Square turret—Finish turn, face and chamfer at 126 r.p.m. .002 feed**

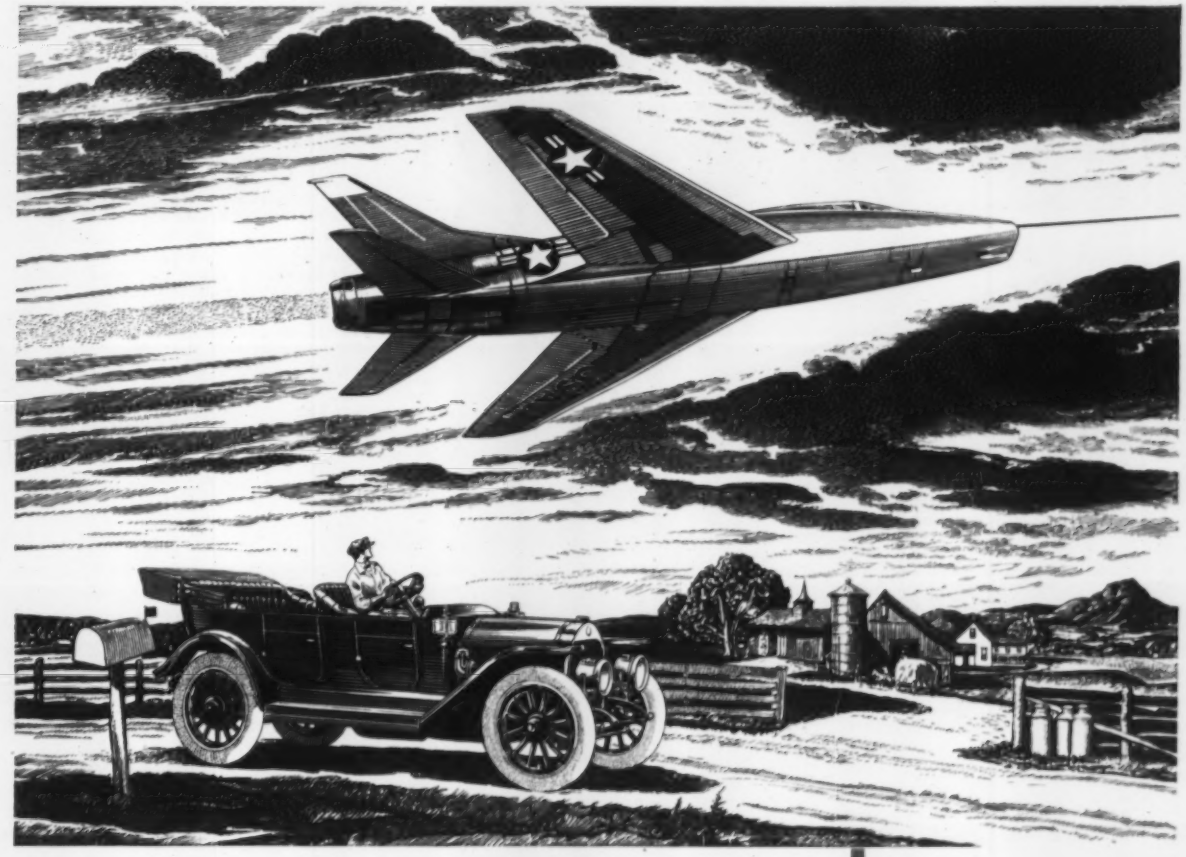
★ **5. Hexagon turret—Start and drill through at 226 r.p.m., .003 feed. Trip the Hi-Lo lever, eliminating even the need for turning the hand wheel**

★ **6. Hexagon turret—Thread with tap at 39 r.p.m., leaders and followers**

—and you're ready for a new workpiece

TURRET LATHES · AUTOMATIC LATHES · SUPERFINISHERS · BALANCERS · SPECIAL MACHINES

From the Stoddard-Dayton to the Super Sabre



Speco's creative engineers have opened new horizons in precision!

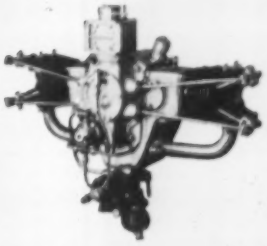
If you recall the Stoddard-Dayton, then surely you remember the Jenny – the sweetheart of World War I. They were a couple of kids who "grew up together" . . . the car and the airplane. And today their grandchildren are the mainstays of our national economy.

We like to feel that our leadership in precision on a mass production basis has played a big role in this growth. Our work in all industries–automotive, aviation, industrial . . . in fact, in all fields of mechanics and hydraulics – has made great contributions. Our team of precision engineers, toolmakers and machinists makes certain that *If We Ship It . . . It's Right!* If you have a job with which you feel we might help, a short letter or a telephone call will bring prompt, sound guidance. Or if you'd like the whole SPECO story–from plant to people to products, send for our new Plant Brochure. The Steel Products Engineering Company, Springfield, Ohio.

THE STEEL PRODUCTS ENGINEERING COMPANY

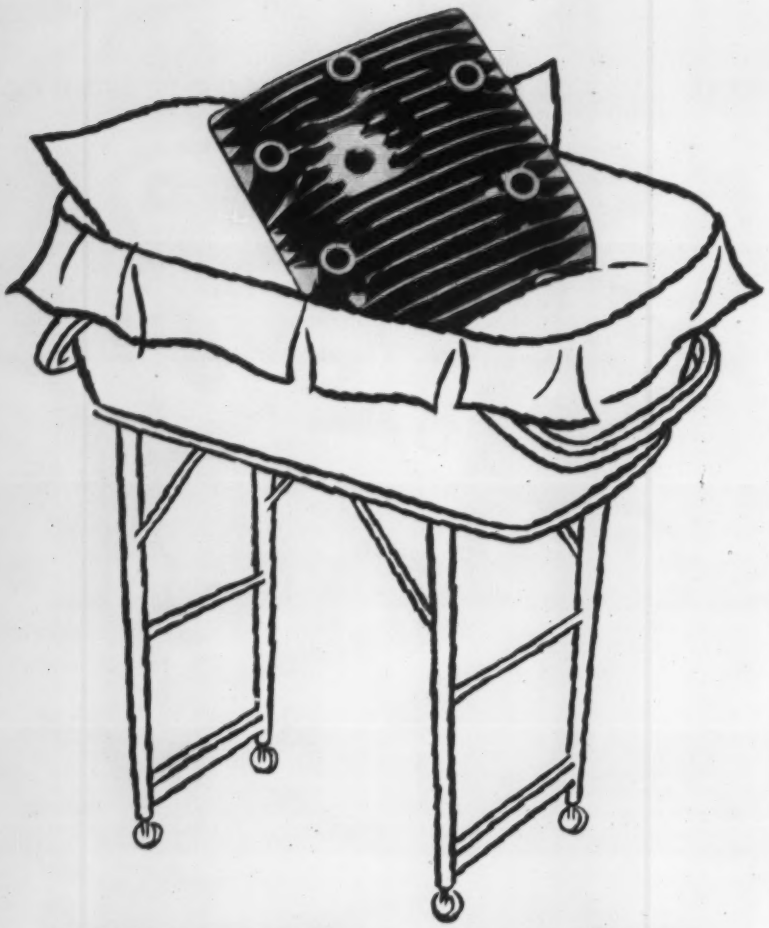
SPECO

BEAUTIFUL 11" X 14" REPRODUCTIONS OF THIS PICTURE SUITABLE FOR FRAMING WILL BE SENT ON REQUEST—FREE.



One of our early contributions to aviation–this two cylinder, Opposed Piston Blower Engine produced by Speco in 1924.

Today we're building precision mounts for nearly every major manufacturer of radar equipment–and many other component parts.



This casting took a lot of pre-natal care

The success of a casting is often determined long before the metal is melted and the casting poured, because no matter how carefully casting is done nor how excellent the mold, a quality part cannot result unless quality metal is used.

Foundries and die-casters need ingots that will be alike in quality and characteristics from lot to lot, especially when castings of intricate character must be precisely cast in quantities. To assure such results, the Federated Metals Division of American Smelting and Refining Company employs the most modern quality control methods. Electronic testing devices and expert metallurgists check each heat poured from Federated's furnaces.

Both supporting and preceding quality control is Federated's modern Central Research Laboratory, which has developed alloys such as Castomatic® type metals and solders and Tenzaloy, the high strength aluminum alloy that ages without heat treatment.

Whatever you need in non-ferrous ingot metal, or in technical service to assure good non-ferrous castings, think of Federated first as your source of supply and technical information. Our broad experience with all kinds of non-ferrous metals has earned us our reputation as Headquarters for Non-Ferrous Metals.

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LETTERS
TO THE EDITORS

Editorial Lauded

My compliments on your fine editorial, "Know Your Costs" (July 25, page 39).

If only more managements (particularly those producing and selling castings) would follow the advice of the structural steel executive quoted, industry would fare better over the long pull. While I refer to castings, we are particularly concerned about the broad field of gray irons we produce and sell.

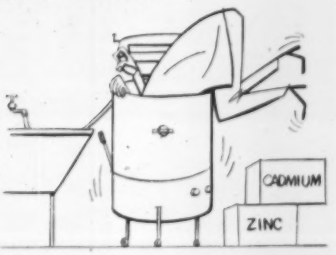
The Gray Iron Founders' Society has worked to provide tools (cost manuals and cost services) that should serve the gray iron casting industry, but it seems to be an endless, fruitless struggle.

We find STEEL of considerable interest each week as it comes to our desk, with the first point of attention, "The Editor's Views."

Congratulations on your fine publication.

Peter E. Rentschler
President
Hamilton Foundry & Machine Co.
Hamilton, O.

Zinc or Cadmium?



In the interesting article, "Salt Spray Passes Acid Test" (May 9, page 92), you refer to the superiority of zinc to cadmium plate on city streets. This seems familiar to me, but I cannot find any reference to verify it.

We are faced with the choice of zinc or cadmium for plating a steel bracket holding the water mixer in home clothes washing machines. Cadmium is being used, but there is interest in changing to zinc.

Can you give us any specific references on this subject? We certainly enjoy your fine publication and will be grateful for any suggestions you offer.

R. A. Smith
Chief Metallurgist
Fulton Sylphon Division
Robertshaw-Fulton Controls Co.
Knoxville 1, Tenn.

• *We suggest you consult* Corrosion Handbook, *sponsored by the Electrochemical Society and published by John Wiley & Sons, New York, N. Y. See the section on metallic coatings.*

Modernization Advocate

I think the story, "When To Re-Equip" (June 20, page 99), is timely and well done.

The modernization and replacement market is the big market for the machine tool industry today, and it is a

(Please turn to page 12)

ACCURATE BLANKS for

all these products are produced on

Cincinnati Shears

SEE
CINCINNATI
SHAPERS, SHEARS,
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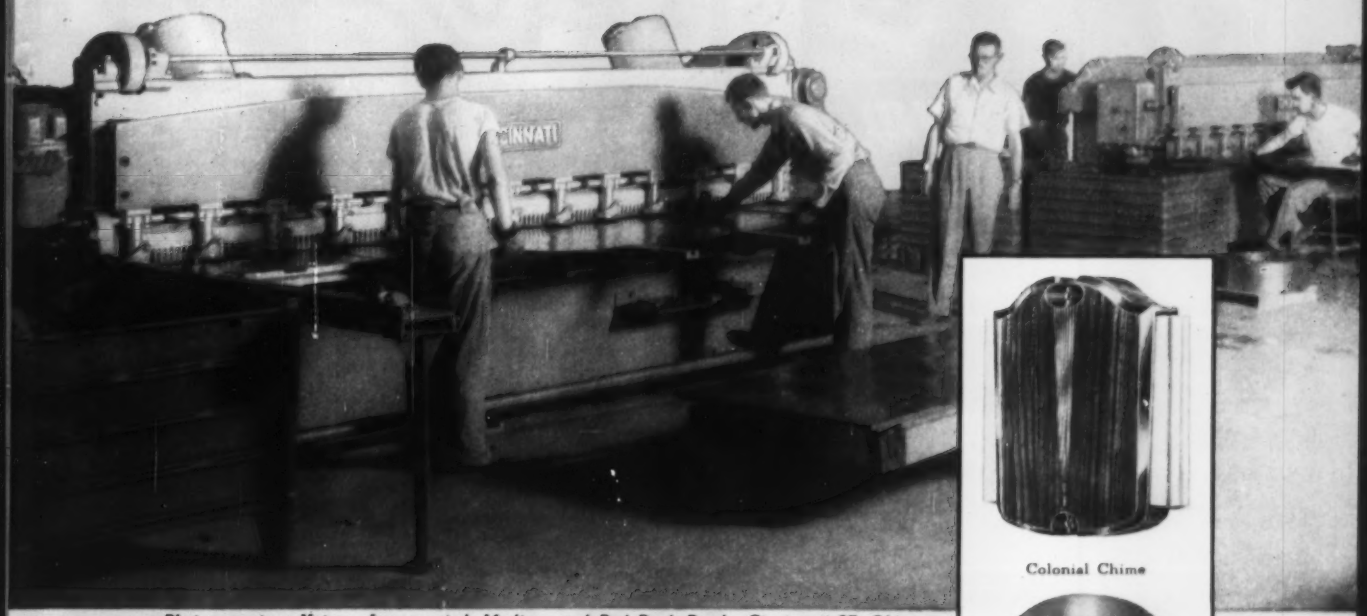
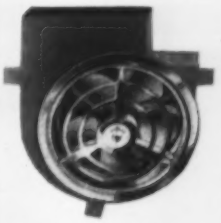


Photos courtesy Nutone, Incorporated, Madison and Red Bank Roads, Cincinnati 27, Ohio.

Colonial Chime

Electric Ceiling Heater



Ventilating Fan

Accurate blanks and strip stock of many sizes are sheared on these Cincinnati Shears at Nutone, Inc. The shearing operation eliminates costly dies, is flexible, rapid and economical.

One hundred and seventy-five tons of light sheets are sheared a month. Press operations are speeded and spoilage is at a minimum. The flexibility of the shearing operations take care of new products or changes in design with no tooling or special costs. Investigate these accurate Shears.

Write for catalog S-6.

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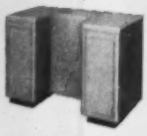
GUARDS

CARBIDE GRINDER BASE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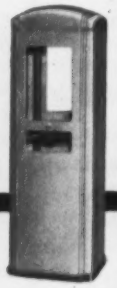
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LETTERS

(Concluded from page 10)

surprising thing to me that metalworking companies allow obsolescence to creep up on them between wars. It is something very hard to explain to any rational person, and something that our salesmen have to overcome.

Tell Berna
General Manager
National Machine Tool Builders' Association
Cleveland

Your article is very interesting, particularly the "Quick Check" method (page 106) and the "Four Steps to Modernization" (page 104). Please forward 25 reprints so that we may circulate this article to our various plants.

E. J. Wierzbicki
Engineer
American Steel Foundries
Chicago

Ingot Rate Districts

Will you forward a geographical breakdown by plants of your 13 ingot rate districts as published under the Market Outlook column? Are they based upon the six districts of the American Iron and Steel Institute?

We use this information, but, without knowing its background, hesitate to lean heavily on it.

L. R. Burnett
Sales Service Dept.
Kaiser Aluminum & Chemical Sales Inc.
Oakland, Calif.

• *We are forwarding this list. The breakdown by districts is made arbitrarily by computing agencies. For instance, AISI includes the Cleveland and Lorain, O., mills in its Cleveland-Detroit district. We believe this is too large an area and have separated Detroit and Cleveland districts. While district boundaries differ, capacities (based on AISI reports) are identical.*

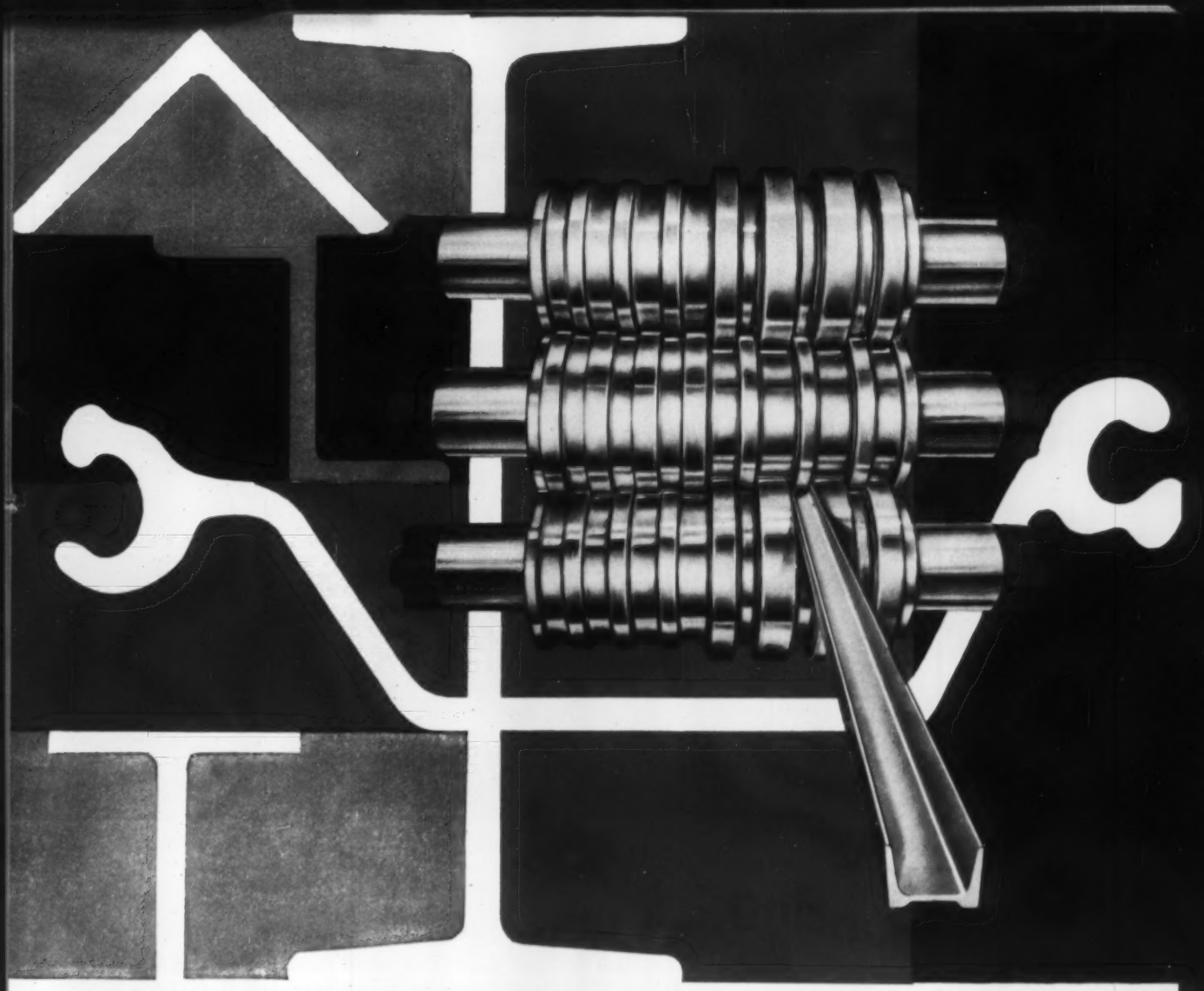
Definition of Terms

We want to obtain literature explaining and defining terms used in grading iron and steel scrap. For instance, what type material is included in "No. 1 Melting," "No. 1 Cupola" and "No. 1 R.R. Heavy Melting"?

We need this information for a proposed study of our scrap requirements.

W. A. Barz
Purchasing Agent
Calumet Division
Calumet & Hecla Inc.
Calumet, Mich.

• *This and other valuable information can be found in the 1955 yearbook of the Institute of Scrap Iron and Steel. Write the Institute at 1729 H St. N. W., Washington 6, D. C.*



High tonnage schedules in structural mills call for the stamina of

MACK-HEMP STRIPED RED WABBLER ROLLS

Skilled operators know from their records that they can depend upon MACK-HEMP Rolls to produce clean, accurate structural shapes on a high production basis. They know, too, that MACK-HEMP keeps in close touch with mill practice developments and with roll designers and mill operators to produce rolls that assure low cost operating.

This is being proved in practice in most prominent mills today, both large and small, by the strong, tough Midland Superalloy Rolls in roughing stands and the wear-resistant Midland Supermetal Rolls in intermediate and finishing stands.

Continuous developments in metallurgical and manufacturing practices make it increasingly worth your while to keep an eye on what's new and different at MACK-HEMP.

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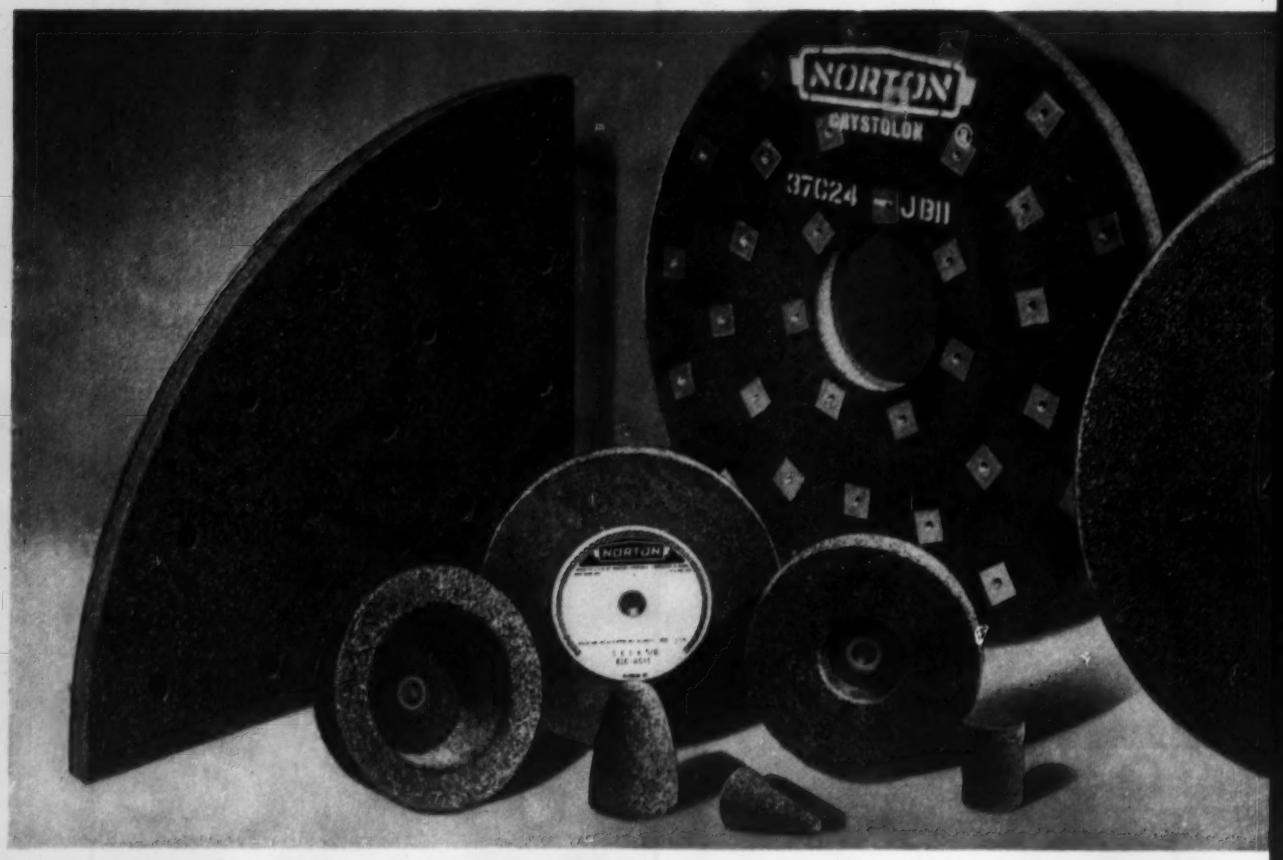


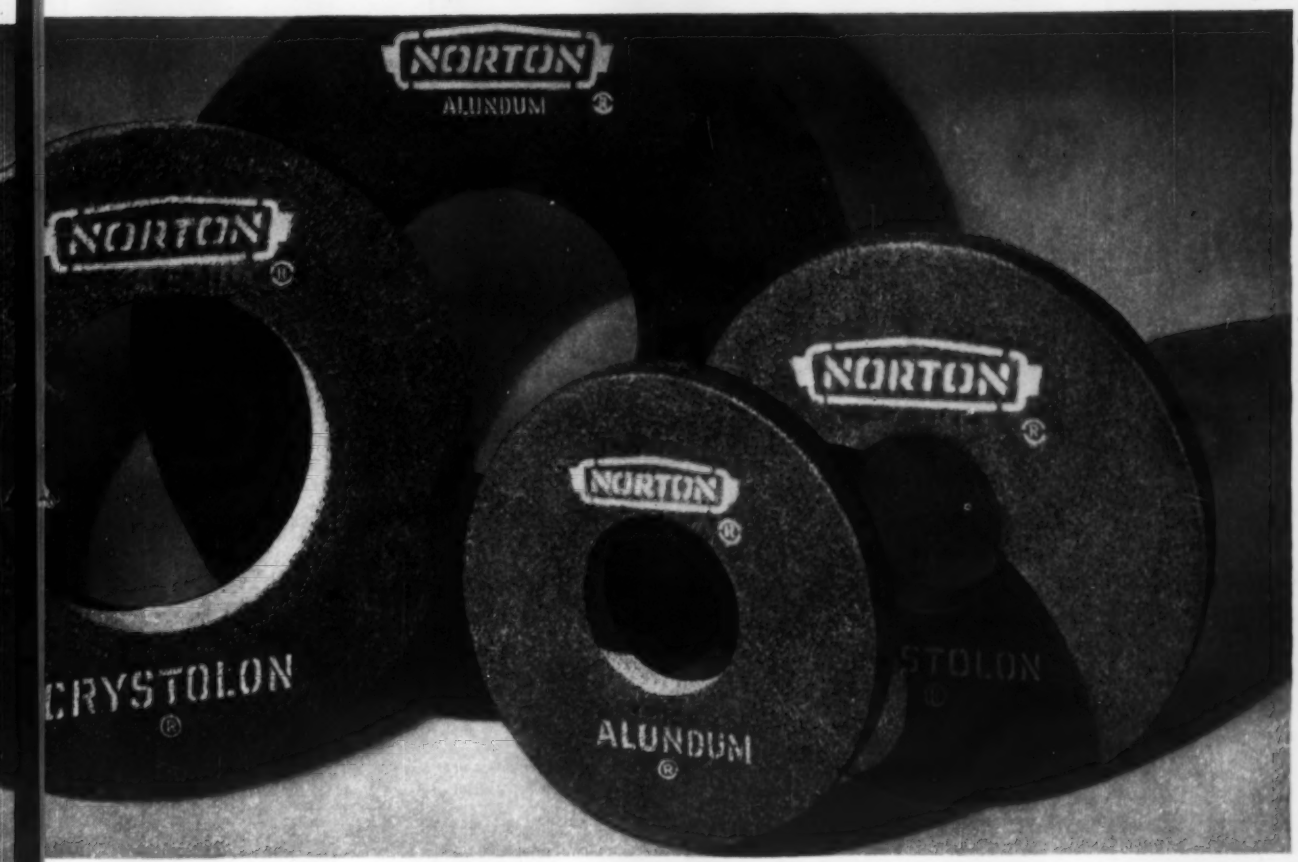
Announcing: The B·11 – a great new Norton resinoid bond

Bringing new "TOUCH of GOLD" advantages to your snagging, B11 wheels are more uniform, better balanced, easier to choose and to use

Joining the list of famous Norton bonds that have made grinding wheel history, the new B11 resinoid offers unique advantages to a wide range of rough grinding applications, on all types of machines. Here's why:

New processing developments have resulted in wheels of extremely uniform structure bringing new standards of balance. As a result, B11 wheels "hug that work" closer, grind cooler and faster, with far less vibration and bounce. This more efficient grinding action means less operator-fatigue and longer wheel life.

In addition, you get closest possible duplication with B11 wheels. Hardness increments are evenly spaced throughout the entire grade scale. Since the one B11 bond includes a wide range of hardness grades, you no longer need to make the grade conversions required when changing from one resinoid bond type to another. And to make



it even easier for you to choose exactly the right wheel for every job, B11 wheels are available in half-grade increments. For example, where grade J is too soft and grade K too hard, you can specify grade J+ — which is exactly half-way between J and K.

How the "Touch of Gold" brings out hidden profits

B11 wheels are typical examples of how "Touch of Gold" performance is built into every Norton grinding wheel. In your own plant, they mean more value added to your products, more metal ground off per dollar, more time and money saved — important benefits that bring out the *hidden profits* in countless grinding jobs. And remember: only Norton brings you such long experience in both grinding wheels and machines to help you produce more at lower cost.

Your Norton Distributor

will gladly arrange test runs of the new B11 resinoid bonded wheels in your own shop. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass. W-1664

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FIFTY TON - - - - 3-50 SERIES

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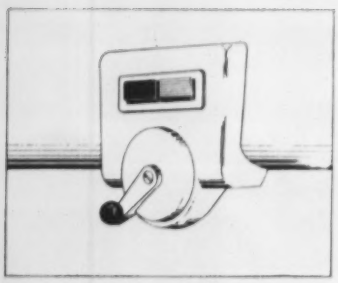
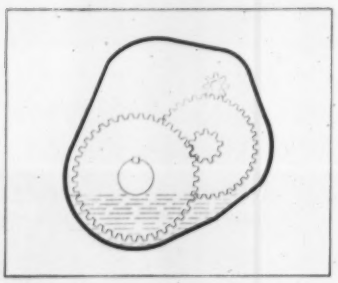
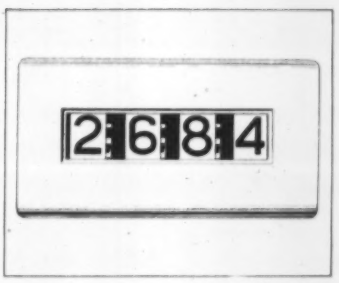


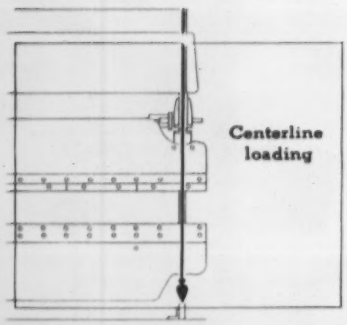
Front controlled, variable speed drive, 20 to 50 strokes per minute.



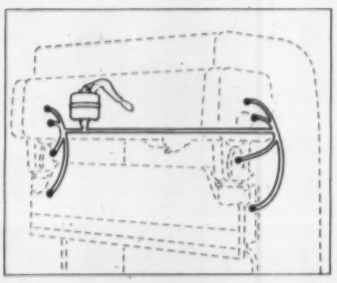
Completely enclosed transmission, running in oil.



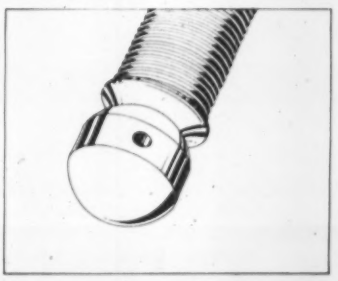
Two micrometer indicators, one at each end of the ram—easy to read and accurately record the amount of adjustment and tilt.



Centerline loading prevents weaving of the housings and insures accurate bends.



Centralized pressure lubrication system.



Ball end on the ram adjusting screws permits tapering of the ram for fade-out work.

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2-30 SERIES

This new 2-30 Series Cincinnati All Steel Press Brake has a capacity of 14 gauge x 6′ mild steel.

Look at these unusual standard features:

2½″ stroke—12″ shut height—9″ throat.

Distance between housings 5′-2″—overall die surface, 6′-0″.

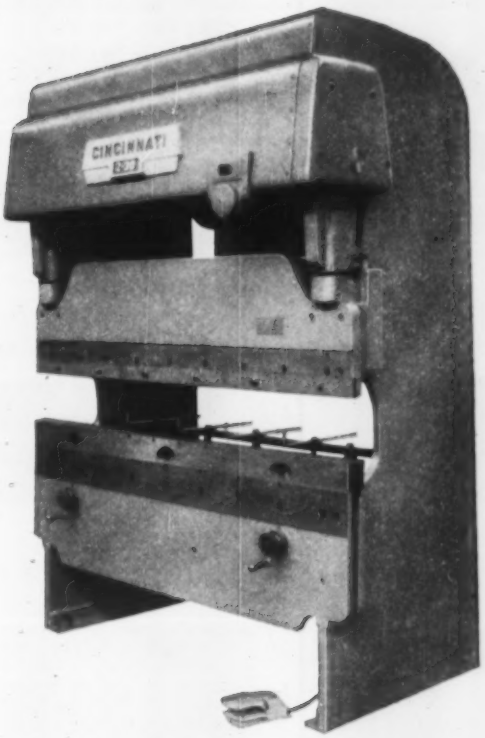
Front controlled, variable speed drive, 20 to 50 SPM. 4″ manual ram adjustment including ram tapering adjustment for fade-out work (power adjustment available as extra feature).

Bronze swivel end-guide bearing for accurate endwise alignment, even when tilting ram.

Brushless electro-magnetic brake and clutch.

Deep bed and ram, planed and drilled for 5¾″ angles.

Micrometer indicators on both ends of ram for fast, accurate setting.



3-50 SERIES

These new 3-50 Series Cincinnati All Steel Press Brakes are built in two lengths and have a capacity of 10 gauge x 6′ mild steel. Investigate these unusual standard features: 3″ stroke—12″ shut height—12″ throat—distance between housings 6′-6″ or 10′-6″—overall die surface 8′-0″ or 12′-0″—front controlled, variable speed drive, 20 to 50 SPM.

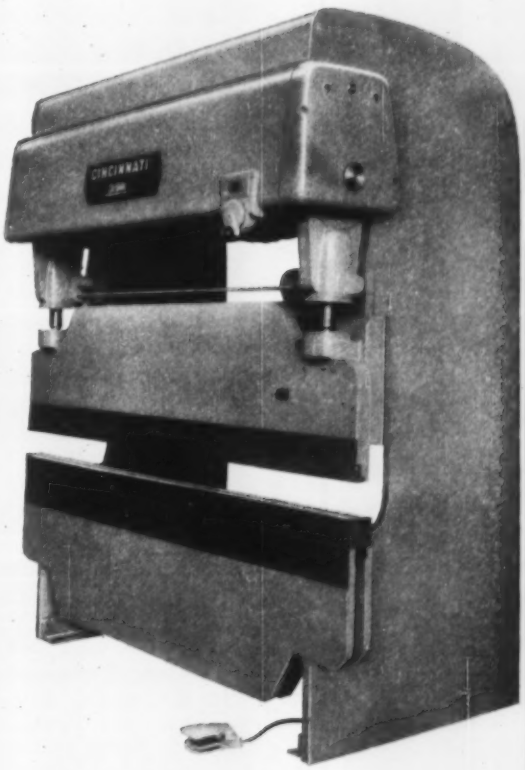
5″ motorized ram adjustment, including ram motor and control, complete with ram tapering adjustment for fade-out work.

Bronze swivel end-guide bearing for accurate endwise alignment, even when tilting ram.

Brushless electro-magnetic brake and clutch.

Deep bed and ram, planed and drilled for 5¾″ angles.

Micrometer indicators on both ends of ram for fast, accurate setting.



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with the new SIGMA SPOT-WELDING *process*

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- Adds filler metal automatically
- Welds from one side of the joint
- Shields weld area with inert argon gas
- Operates on Constant Potential power supply

Spot, plug, and tack-weld with one torch. With sigma spot-welding you can make strong spot welds quickly on lapping metal sheets up to ⅛-in. thick, plug and tack-welds on metals up to ¼-in. thick—and you need access to only one side of the weld joint. Use it on carbon, galvanized, or stainless steel, and copper-base alloys.

It's easy to use. Position the "muzzle" of the water-cooled torch and squeeze the trigger—the machine does the rest. A consumable wire electrode is fed into the weld area as filler metal. Inert argon gas protects the weld from the air. You can make up to 10 welds a minute, with a completely automatic welding cycle.

Constant Potential adds to efficiency. Sigma spot-welding equipment operates on constant potential power supply to give you the benefit of simplified controls, sure starting, and precise arc voltage. Weld-cratering and wire-sticking are eliminated. Welds are smooth and consistently uniform.

Your local LINDE representative will be pleased to give you booklet F-8778 and more detailed information on the sigma spot-welding process.

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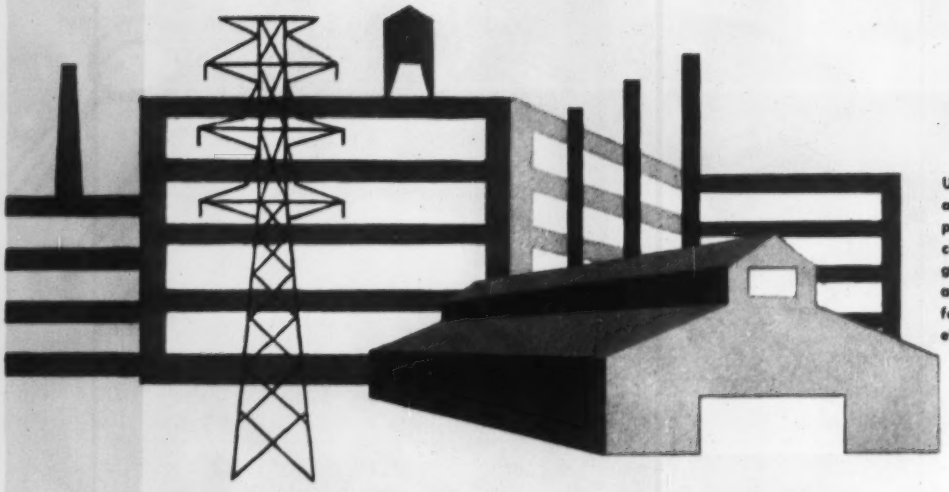

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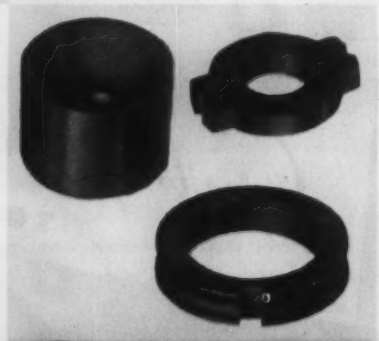

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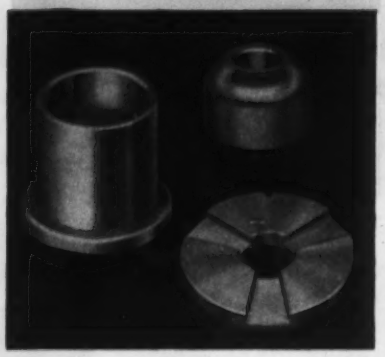

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CALENDAR
OF MEETINGS

Aug. 15-17, Society of Automotive Engineers Inc.: West coast meeting, Multnomah hotel, Portland, Oreg. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Aug. 22-23, Stanford Research Institute and National Industrial Conference Board: Symposium on electronics in automatic production, Sheraton-Palace hotel, San Francisco. Information: National Industrial Conference Board, 247 Park Ave., New York 17, N. Y. Secretary: Herbert Briggs.

Aug. 24-26, West Coast Electronic Manufacturers Association: Western electronic show and convention, Civic Auditorium, San Francisco. Information: WESCON, 344 N. LaBrea Ave., Los Angeles 36, Calif.

Aug. 28-Sept. 1, National Association of Furniture Manufacturers: Furniture supply fair, Conrad Hilton hotel, Chicago. Association's address: 666 Lake Shore Dr., Chicago 11, Ill. Secretary: John M. Snow.

Aug. 31-Sept. 26, World's Fair of Power: S. Lake Shore Dr. adjacent to Soldiers Field, Chicago. Sponsor: General Motors Corp., General Motors Bldg., Detroit 2, Mich.

Sept. 5-8, American Machine Tool Distributors Association: Annual meeting and show, Blackstone hotel, Chicago. Association's address: 1900 Arch St., Philadelphia 6, Pa. Secretary: Thomas A. Fernley Jr.

Sept. 6-8, Industrial Truck Association: Fall meeting, the Greenbrier, White Sulphur Springs, W. Va. Association's address: 526 Washington Loan & Trust Bldg., Washington 4, D. C. Managing director: William Van C. Brandt.

Sept. 6-8, Material Handling Institute Inc.: Fall meeting, the Greenbrier, White Sulphur Springs, W. Va. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

Sept. 6-17, Metalworking Machinery & Equipment Exposition: Coliseum, Chicago. Information: Exhibition & Convention Management Inc., 2689 E. Overlook Rd., Cleveland 6, O. General Manager: C. L. Wells.

Sept. 6-17, National Machine Tool Show: International Amphitheatre, Chicago. Sponsor: National Machine Tool Builders' Association, 2071 E. 102nd St., Cleveland 6, O. General Manager: Tell Berna.

Sept. 6-17, Production Engineering Show: Navy Pier, Chicago. Sponsor: National Machine Tool Builders' Association, 2071 E. 102nd St., Cleveland 6, O. General Manager: Tell Berna.

Sept. 9-11, Metal Powder Association: Fall closed meeting, the Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Sept. 11-14, National Metal Trades Association: Eastern plant management conference, Essex and Sussex hotels, Spring Lake, N. J. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: C. L. Blatchford.

Sept. 11-16, American Chemical Society: Fall meeting, University of Minnesota, Minneapolis. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 12-14, American Road Builders Association: Annual conference of county engineers and officials, New Riverside hotel, Gatlinburg, Tenn. Association's address: World Center Bldg., Washington 6, D. C. Secretary: Eugene Reybold.

Sept. 12-14, Allied Railway Supply Association: Annual meeting and exhibit, Sherman hotel, Chicago. Association's address: P.O. Box 5522, Chicago, Ill. Secretary: Charles F. Weil.

Sept. 12-15, Automotive Electric Association: Fall meeting, the Homestead, Hot Springs, Va. Association's address: 16223 Meyers Ave., Detroit 35, Mich. Secretary: S. W. Potter.

Sept. 12-15, Society of Automotive Engineers Inc.: Tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

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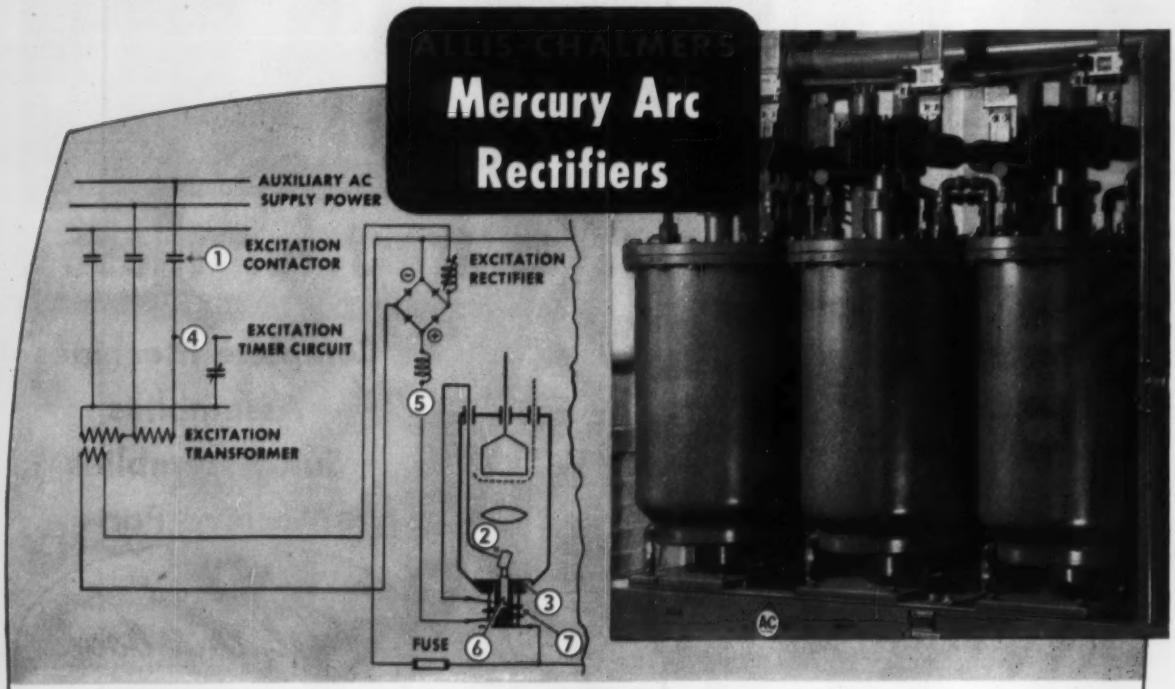
Get all the facts about excitron rectifiers before your next installation. Call the A-C office nearest you or write Allis-Chalmers, Milwaukee 1, Wisconsin.



Supply of DC Provides Key to Continuous Excitation

Direct current supplied from excitation rectifiers is the key to continuous excitation. When the excitation system is energized by means of a contactor (1), positive dc potential appears on the excitation anode (2) of each tube, negative at the cathode (3). A timer (4), through contacts of the excitation failure relay (5), is energized at the same time.

As soon as voltage is applied, current flows from the anode to the cathode through the ignition plunger (6). This current energizes the ignition coil (7) and causes the plunger to be pulled below the mercury surface. As the plunger travels down, an arc is drawn which transfers from the graphite tip of the plunger to the mercury. This current flow keeps the coil energized, maintaining a continuous arc.

If excitation failure should occur while the rectifier is carrying load, the plunger is released, floating upward in the mercury until it makes contact with the anode, then repeating the process above until the arc is re-established.

Re-establishment of the arc as outlined takes less than a second — it does not interfere with normal operation.

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They used to tell you where you could go when you asked for certain sizes and lengths in heavy-wall seamless tubing. Usually, where you had to go was Europe!

Not any more. Barium cocked a knowing eye at the situation, built a rotary forging seamless tube mill in Phoenixville, Pa., for its member company, Phoenix Iron & Steel Co. ("Step-ahead" thinking like this, by the way, accounts for Barium's notable growth record in the past few years.)

We underline "fast delivery" in the headline because this new mill is specifically designed for *fast change-over* from one size and type of heavy-wall tubing to another.

Now U.S. industry can count on Phoenix for "home-grown" heavy-wall seamless tubing in the special types required to handle today's higher pressures and temperatures in power and process plants as well as oilfield deep-drilling. For more facts about this new mill — or for "The Barium Story" — write to Barium Steel Corporation, 25 Broad St., New York, N.Y. 5.4

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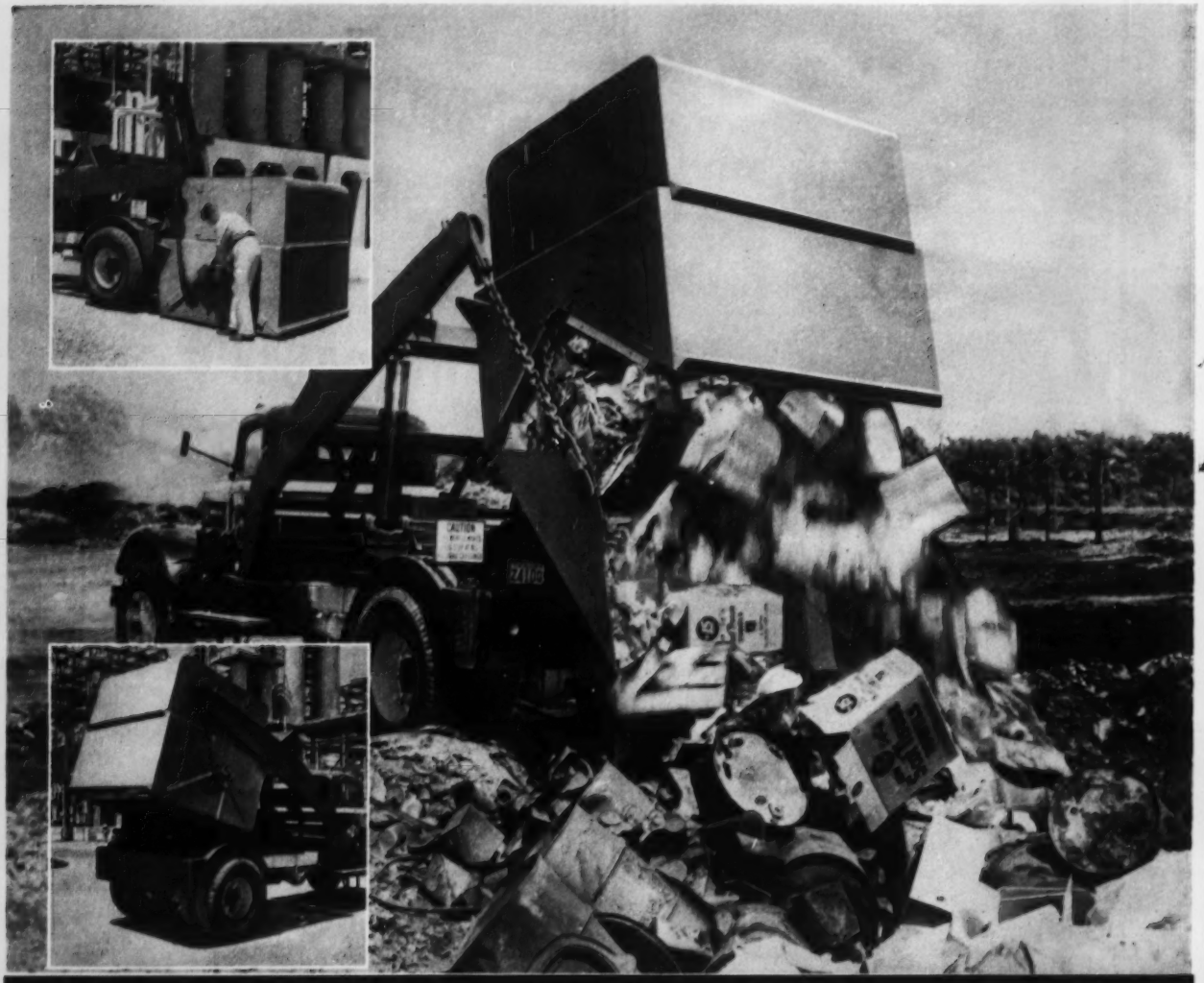
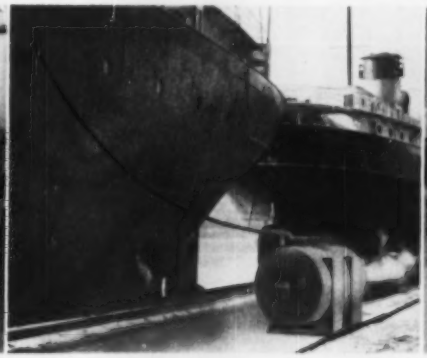


Here's *MASS-HANDLING* of bulk

What you see above is a Dempster-Dumpster serving one of its detachable containers. Multiply this simple pick up, haul and dump operation by scores of steel containers built to meet your requirements for handling waste or salvable materials, raw and finished products, fluids including acids, combustibles, dusty materials, etc. You have, then, mass-handling of bulk materials with one truck and one man!

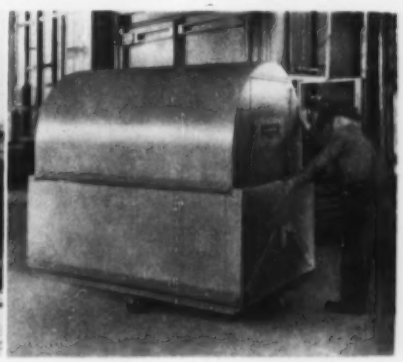
Tilt Type Container is handling filter dirt at a plant in Illinois. Note container is equipped with casters and placed under chute, through which the filter dirt passes directly from presses. As each container is filled, it is replaced with an empty one.

Three heavy duty Drop Bottom Type Containers, shown below, are loaded with cast iron fittings from conveyor at plant in Birmingham. Dempster-Dumpster picks up each container when loaded and hauls the finished products to shipping department.



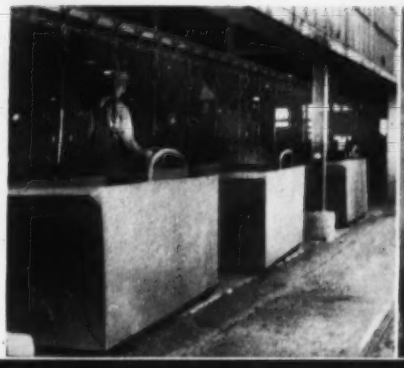
Tank Type Container is being filled with used oil from a ship. Time required to haul loaded container to reclaim station, drain and return for refilling—10 minutes. Time cycle of the former method using conventional barrels—60 minutes.

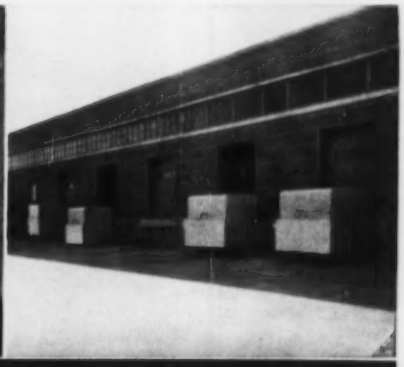
Here's another example of the many types of waste materials handled by this system. The Skip Type Container shown below is located under hydropulper at a paper plant. Picture was shot while container was being filled with rope waste sludge.



A loaded Apartment Type Container, equipped with roller bearing casters, is being rolled to outside of this plant building. Dempster-Dumpster will pick it up, haul to disposal area, dump the refuse and return empty container for refilling.

Waste materials are loaded into these Universal Containers at a food plant warehouse. Containers have lids in top, as well as a door in each end, which are opened to make deposits, then closed, sealing materials in container.





materials with one truck...one man!

A FEW OF THE HUNDREDS of containers available are shown above in actual service. They are built in capacities up to 21 cu. yds.—several times the capacity of the average dump truck body. One Dempster-Dumpster, operated by only one man, the driver, serves scores of big detachable containers, one after another—handling materials of every description. It's like having one truck with scores of bodies!

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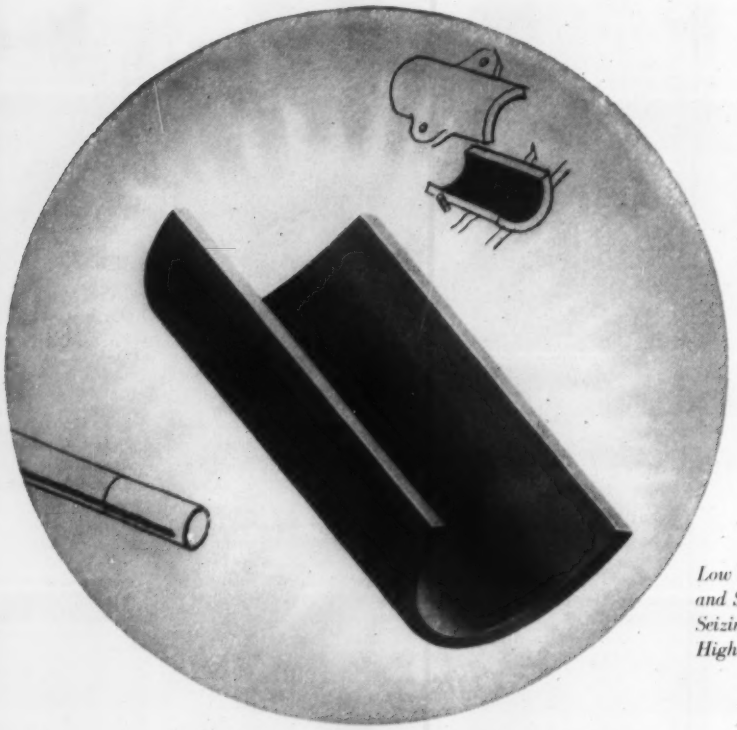

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Bearing parts made of HAYNES STELLITE alloy resist the abrasive effects of wet or dry materials such as fly ash, coke, metal powder, shale, and cement dust. They are hard enough to carry heavy loads, and tough enough to stand up under repeated stress.

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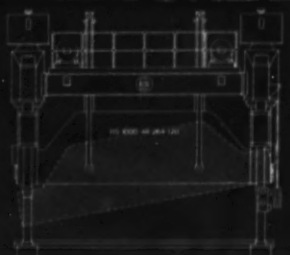

Rocking action illustrated: slide comes down on work and then rocks back and forth to bend it into desired shape. Key to this smooth rocking action is the fact that weeks were spent in hand-finishing the mirror-like seats at the ends.

At Boston Naval Shipyard, this 1000-ton Bliss keel bender shapes hull, bulkhead and keel plates up to 22 feet long and 10 feet wide—faster, easier and at less cost than previous installations. And here's why . . .

This press operates like a press brake, but has a unique and different slide (ram) action—it can be moved up or down on an angle and rocked back and forth. With this "skewing" action and properly designed dies, this hydraulic press can form the many different hull and keel plates needed.

The "skewing" action is achieved this way: the pressing beam, while rigidly secured in the slide housings, is flexibly mounted in the crossheads on mirror-like ball seats. This permits the full action desired and gives the press its versatility. The result is a wide choice of pressing combinations and greatly increased production.

In fact, the Navy reports it's "a decided improvement" over older units. Recently, a twin bender was installed at the Charleston (S. C.) Naval Shipyard.

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In the modern warehouse shown at left, the steel decking and rolling steel doors were cold roll formed and installed by the R. C. Mahon Company, Detroit, Michigan.

In the photo of an Armstrong furnace below, the arrows point to the jacket rings and two pilasters framing the front openings—all cold roll formed at a big saving compared with previous methods.

The new Yoder book on Cold Roll Forming is an illustrated story of many of the things which are made lighter, stronger and more accurately by this process than by any other, yet at greatly reduced cost. It is also a complete textbook on the machines, their tooling, operation, and economic possibilities.

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DESIGNING WITH ALUMINUM

This is one of a series of information sheets which discuss the properties of aluminum and its alloys with relation to design. Extra or missing copies of the series will be supplied on request. Address: Advertising Department, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California.

NO. 14

PREPAINT TREATMENT OF ALUMINUM

THE prepaint treatment of aluminum is more important to the quality of the coating system than is the paint itself.

Depending on type of service, severity of exposure, and cost consideration, the prepaint treatment may vary from wiping the surface clean with a rag dampened in solvent to the application of a complex chemical conversion coating.

Three factors determine the quality of the finishing system:

1. Thorough cleaning and complete rinsing.
2. Proper choice and application of adequate surface preparation.
3. Specified application of proper paint system.

Cleaning

The five major methods of cleaning aluminum before further surface treatment are: 1. mechanical. 2. alkaline detergents. 3. emulsion cleaners. 4. organic solvents. 5. acid cleaners.

When the metal is heavily soiled, or when the soil is difficult to remove, two or more of these cleaning methods may be necessary.

Some types of metal soiling occur naturally. Other types of soil are intentionally applied during fabrication. The soil may consist of solid particles (metal chips, abrasive grains, shop dirt, etc.), organic substances (greases, soaps, buffing compounds, etc.) and corrosion products (oxides, etc.), each affecting the choice of the cleaning method.

These soils may vary greatly from one industrial plant to another or on different kinds of work in the same plant. Consequently, a universal cleaning process is not possible, and the selection of the proper cleaning method for removing each particular soil becomes as important as any other step in the entire painting procedure.

Table I may be used as a guide in selecting cleaning methods for certain types of soils. However, the advice and services of the suppliers of cleaners and cleaning machinery should be solicited.

Chemical Surface Treatments

Chemical surface treatments are designed to provide:

1. A surface that will provide the most "keying" for subsequent coatings.
2. A stable, adherent, corrosion resistant film that will protect the metal if the paint chips, cracks or flakes from a small area or spot and which will prevent the spread of corrosion under the paint film.

The chemical surface treatments that have been developed may be divided into two general groups; those produced with the aid of electrical current, and those produced without electrolytic action. The latter are known as chemical conversion coatings.

Anodic Electrolytic Process

Anodizing is the most widely used process for surface treatment of aluminum. Anodic coatings may be produced by

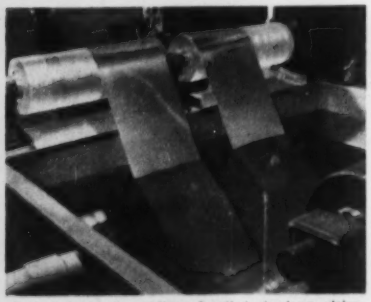
PLEASE TURN TO NEXT PAGE ➡

TABLE 1. **Article Prepared by the Kaiser Aluminum Metallurgical Research Department and Reprinted With Permission from *Western Industry*, October, 1954.**

	Mechanical Cleaning	Alkaline Cleaners	Emulsion Cleaners	Organic Cleaners	Acid Cleaners
TYPES	Shot blast. Grit blast. Wire brush. Sandpaper.	Hot or cold. Etching or non-etching. Immersion. Spray.	Immersion. Spray.	Solvent wiping. Solvent immersion. Vapor degreasing.	Organic and inorganic acids. Usually mixture of two acids.
USES	Castings. Rough work. Heavy pieces. Removes surface dirt and corrosion products.	Best for removal of widest range of soils. Etching type good for corrosion products.	Removes oil, grease, and some loose dirt. No effect on corrosion products.	Removes oil, grease and some loose dirt. No effect on corrosion products.	Removes corrosion products or pickle. Neutralizer after alkaline cleaning. Smut removal.
EFFECTIVENESS	Provides mechanical adhesion. Removes surface metal and oxide.	Most effective of the group. Better with acid rinse.	Not effective on adherent soils or corrosion products.	Since the dissolved oil and grease remain in solution, some is redeposited.	Best if used in conjunction with alkaline cleaners or vapor degreasers. Some types used as paint base.
AFTER-TREATMENT	Further cleaning and treatment required for best results.	Neutralize with acid dip or for conversion coating rinse with water.	For best results follow with alkaline or acid cleaner.	For best results follow with alkaline or acid cleaner.	Water rinse.
PRECAUTIONS	Blasting of any type may distort thin sections.	Aluminum is readily dissolved by alkali. Use inhibited solution.	Thorough after-rinse necessary.	Some solvents inflammable, others toxic.	Acids improperly used create health hazards.

TABLE 2	Chromic acid anodizing	Sulfuric acid anodizing
TYPE OF COATING	Gray to greenish-gray impervious oxide film in the range of 0.00003 to 0.0001 in. thick.	Porous oxide film of various color depending on the alloy. Thickness from 0.001 to 0.002 in.
PROPERTIES	Excellent corrosion resistant. Excellent paint base. Good abrasion resistance. Limited as mordant for dyes.	Corrosion and abrasion resistant base for paint. Excellent mordant for dyes.
APPLICATION PROCEDURE	1. Hot mild alkaline cleaner. 2. Cold water rinse. 3. Parts made the anode in a 5–10% solution of chromic acid at 95 deg. F. 4. Increase voltage gradually over 5 minute period to 40 v. Hold for 30 min.	1. Hot mild alkaline cleaner. 2. Cold water rinse. 3. Parts made the anode in a 10–25% solution of sulfuric acid at 65–90 deg. F. and 15–20 v. 4. Hold for 20–30 min. 5. Cold water rinse.
COMMENTS	1. Agitation by air or mechanical stirrer is desirable during processing. 2. May be used on assembled parts since entrapped acid has very little effect on corrosion.	1. Suitable for all alloys of aluminum. 2. Not acceptable on assembled or formed parts where acid may be trapped, because of danger of corrosion by entrapped acid.

many different methods with various degrees of hardness, porosity and thickness. The surfaces they provide are resistant to corrosion and abrasion and are an excellent base for organic finishes. Of the many electrolytes that can be used, the sulfuric acid and chromic acid types have received the widest acceptance in the United States. The important features of each are shown in Table II.



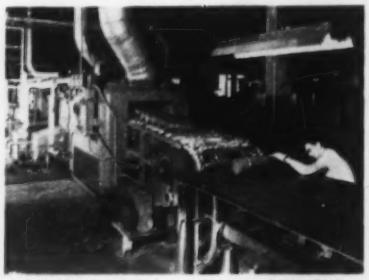
Continuous anodic coating of coiled aluminum strips. Picture courtesy of Monarch Metal Weatherstrip Co.

Conversion Coatings

Only a limited number of chemical conversion coatings for aluminum have been extensively used commercially. They are well adapted to modern production requirements. One of the oldest and best known of these is the M.B.V. (modified Bauer-Vogel) process. The oxide coating it produces is not as hard or thick as an anodized coating, but it is adequate for some applications. Parts to be treated are immersed in an alkali carbonate–alkali chromate solution. Following this immersion, they are rinsed in cold water, then in hot water, and then dried. This treatment produces a good bonding surface for paints, but it is not well suited to aluminum alloys containing more than 5% copper.

Two types of phosphate conversion coatings to come out of World War II as treatments for aluminum are the complex chromate phosphate fluoride coatings and the zinc phosphate coatings. Each of these coatings has many desirable properties and a wide range of applications. The complex chromate phosphate fluoride coating differs from the other phosphate treatments in that the film produced is amorphous rather than crystalline. Since it can be applied by spray or dip following conventional precleaning, it is well suited to mechanized finishing procedures. This type of coating offers an excellent base for paints. The zinc phosphate coating, originally developed for iron and steel, has been adapted to use with aluminum. This type of coating produces a film on aluminum that increases the corrosion resistance and paint adherence of the surface. The outstanding feature of the zinc phosphate coating is that parts with mixed metal surfaces may be successfully treated in one operation. Most surface methods do not have this feature.

Several further improvements in chemical conversion coatings have recently been introduced in the form of chromate finishes. These coating solutions may be applied by brush, spray or dip and the contact times required are relatively short, ranging from seconds to eight minutes. Consequently, they are well suited to automatic equipment. A crystalline chromate coating can be used as a final finish on aluminum or as a base for subsequent paint films.



Automatic phosphatizing of 155 mm. shells. Picture courtesy of Cincinnati Cleaning & Finishing Machinery Company.

One important feature claimed for these new chromate coatings is that they have a minimum effect on the electrical properties of aluminum to be used in either low or high frequency work. Their potential field of application is quite great. As they become more widely used, improvements and modifications are sure to appear. For further information concerning the pre-paint treatments available for aluminum, contact the Kaiser Aluminum sales office listed in your telephone directory, or one of our many distributors. Kaiser Aluminum & Chemical Sales, Inc., General Sales Office: Palmolive Building, 919 North Michigan Ave., Chicago 11, Illinois; Executive Office: 6874 Kaiser Building, Oakland 12, California.

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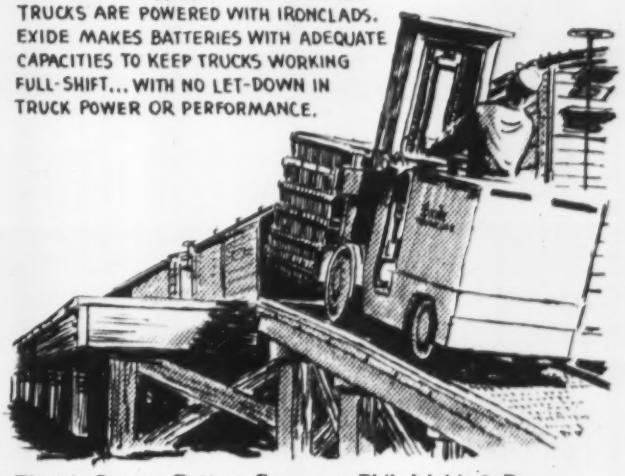

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Wean

FLYING PRESS

Designed primarily for speed of operation, the Wean Flying Press is the first machine of its kind to successfully combine the fast operating advantages of continuously fed strip with dies which move with the strip.

The press differs greatly from conventional machines. Machine tool-like in appearance, it has a minimum of vibration and requires no foundation. In addition to its great speed, it incorporates several new design principles that should interest every press user.

An automatic adjustment of feed length while press is in motion, and the absence of a clutch and brake (the most frequent points of maintenance on conventional presses), are two examples of this advanced engineering.

Wean 60-ton Flying Press stamping out automotive hinge plates at 600 pieces-per-minute, using the same die set which on a conventional press made the parts at a rate of but 90 pieces-per-minute.

Wean EQUIPMENT CORPORATION Cleveland, Ohio

Chicago Newark, N. J. Detroit

(Advertisement)

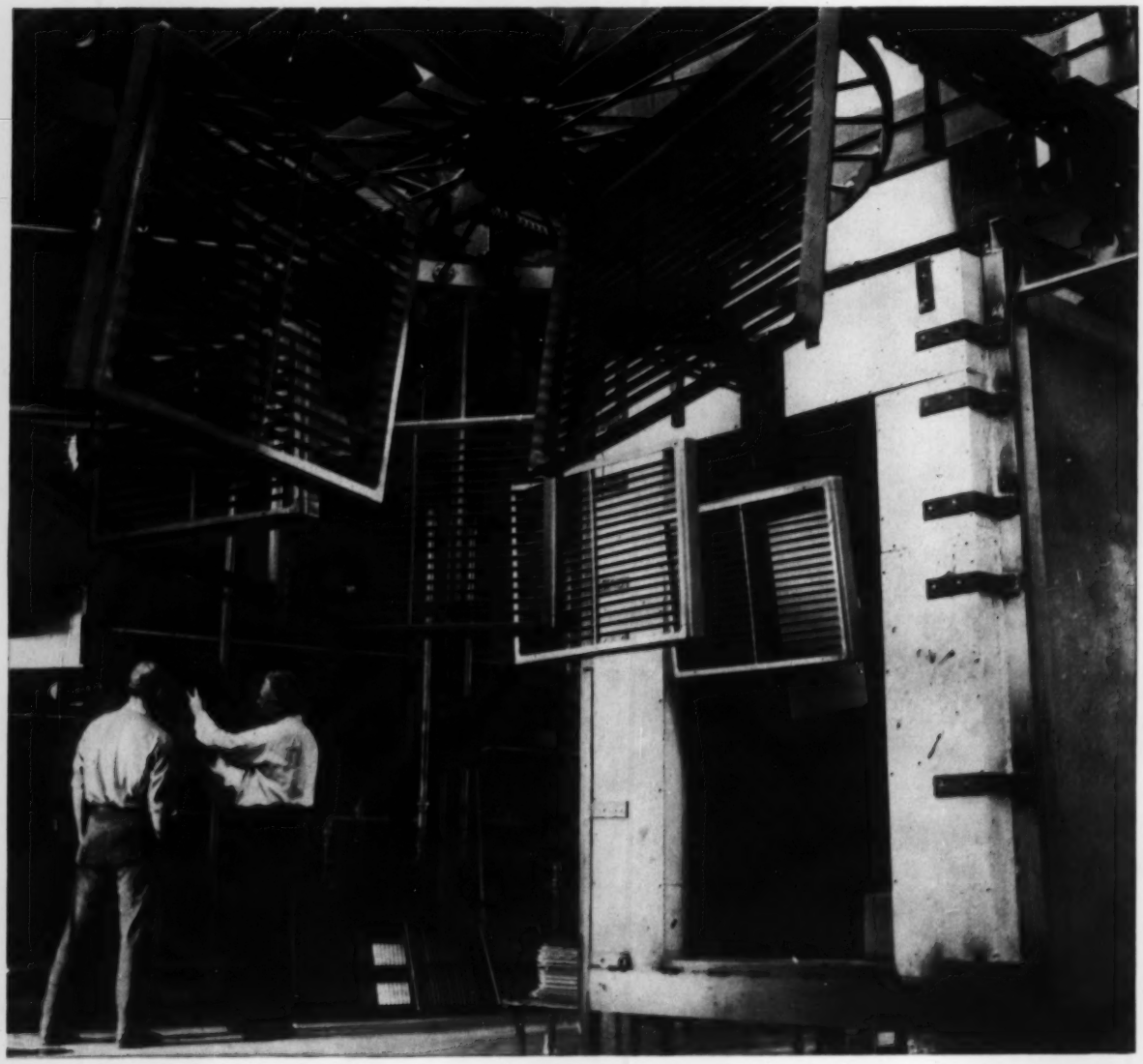
"GAS efficiency speeds our washing, drying and baking process"

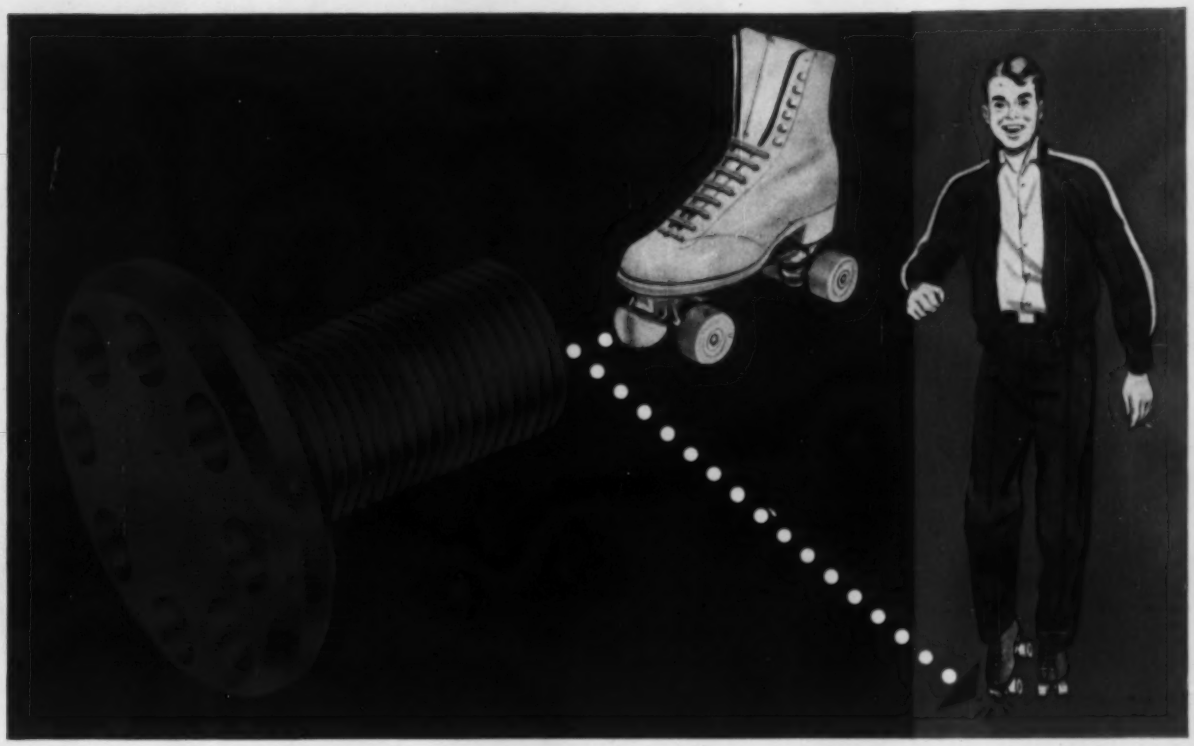
This is a continuous Gas-fired washing, drying and finish baking operation at the Seaboard Metal Products Company in Newark, New Jersey. The company manufactures metal enclosures of all types, as well as related items such as the radiant heating unit covers shown on the conveyor.

The versatility of these Gas-fired units, with a heat input up to five million BTUs, helped owner John Murray convert his shop from a small jobbing to a straight production operation. The units can take any type baking or drying job. Overhead conveyors permit a fast flow of irregular as well as uniform shaped pieces.

Throughout the entire process at Seaboard, Gas is installed as part of the production line. The flexibility of Gas allows close temperature control in a series of chemical baths and rinses preceding the drying and paint-baking process, and without expensive heat-up periods. Gas is this company's choice for fuel because it is faster, cleaner, and keeps operating costs down.

Throughout all industry, Gas is the most satisfactory method of heat processing. That's reason enough for discussing your production problems with your Gas Company's Industrial Specialist. *American Gas Association.*





REYNOLDS ALUMINUM SCREW MACHINE STOCK

gives roller skate toe stop strength without weight

The screw machine part above is made by Ware Brothers Division of Chicago Roller Skate Company . . . manufacturers of quality skates for professional and amateur use. This toe stop takes plenty of punishment but lightweight Reynolds Aluminum screw machine stock offers ample strength and mass—the perfect combination for this part.

The manufacturer says, "We are currently blanking and threading this toe stop part of Reynolds 2011-T3 aluminum rod on automatic screw machines and drilling the holes on drill presses. As production increases all operations will be performed on the automatic screw machines. We also use a forged aluminum foot plate in this skate."

Consider the many advantages of aluminum screw machine stock from Reynolds. Aluminum alloys machine at greater speeds and feeds. This steps up production. And costs for material, handling and shipping step down because strong, lightweight aluminum gives you *three times the pieces per pound.*

For aluminum design and fabrication engineering service and for prompt delivery of screw machine stock, call your nearby Reynolds office or distributor listed under "Aluminum" in your classified telephone directory. Write on business letterhead for the 124-page handbook "Machining Aluminum Alloys". *Reynolds Metals Company, P. O. Box 1800-JL, Louisville 1, Kentucky.*

See Reynolds "Do-It-Yourself" program, Sunday nights on NBC-TV.

REYNOLDS ALUMINUM

MODERN DESIGN HAS ALUMINUM IN MIND

REYNOLDS DISTRIBUTORS

ALABAMA
Southern States Iron Roofing Co., Birmingham
CALIFORNIA
Braice Metals, Inc., *Los Angeles
Clingan & Fortier, Inc., Fresno, *Los Angeles, San Francisco and Vernon
Perry Kilsby, Inc., (Tubing & Pipe) *Los Angeles
Pioneer Aluminum Supply Co., *Los Angeles
Turner Metal Supply Co., (Wire, Rod, Bar) *Huntington Park
Union Hardware & Metal Co., *Los Angeles
United States Steel Supply Div., Los Angeles
CONNECTICUT
American Steel & Alloys Corp., *Hartford
Peter A. Frasse & Co., Hartford
Scovill Mfg. Co., (Wire, Rod, Bar) *Waterbury
FLORIDA
Coral Gables Supply Co., Miami
Southern States Iron Roofing Co., Jacksonville, Miami, Orlando and Tampa
GEORGIA
Southern States Iron Roofing Co., Atlanta and *Savannah
ILLINOIS
Aluminum Distributors Inc., *Chicago
J. G. Braun Co., (Architectural only) Chicago
Joseph T. Ryerson & Son, Inc., Chicago
Scovill Mfg. Co., (Wire, Rod, Bar) Chicago
United States Steel Supply Div., *Chicago
Benjamin Wolff & Co., *Chicago
INDIANA
W. J. Holliday & Co., *Indianapolis
Kaste Steel Corporation, Elkhart
KANSAS
Industrial Metals, Inc., Wichita
KENTUCKY
Southern States Iron Roofing Co., Louisville
LOUISIANA
Southern States Iron Roofing Co., New Orleans
MARYLAND
Clendenin Bros., Inc., *Baltimore
Lyon, Conklin & Co., Inc., *Baltimore
MASSACHUSETTS
Jos. T. Ryerson & Son, Inc., Boston
MICHIGAN
Kaste Steel Corporation, *Detroit and Grand Rapids
McDonnell Bros., Inc., (Architectural only) *Detroit
Meier Brass & Aluminum Co., *Detroit
MINNESOTA
MacArthur Co., (Architectural only), *St. Paul
United States Steel Supply Div., St. Paul
Vincent Brass & Copper Co., *Minneapolis
MISSOURI
Industrial Metals, Inc., *Kansas City and St. Louis
United States Steel Supply Div., St. Louis
NEW JERSEY
Edgcomb Steel and Aluminum Corp., Hillside
Peter A. Frasse & Co., Lyndhurst
Mapes & Sprowl Steel Co., *Union
Roy Miller, Inc., (Tubing & Pipe) *Newark
NEW YORK
J. G. Braun Co., (Architectural only) *New York
Edgcomb Steel and Aluminum Corp., Hillside, N. J.
Peter A. Frasse & Co., Buffalo, *New York, Rochester, Syracuse
Mapes & Sprowl Steel Co., Union, N. J.
Ontario Metal Supply, Inc., (Wire, Rod, Bar) *Rochester
NORTH CAROLINA
Southern States Iron Roofing Co., Raleigh
OHIO
Kaste Steel Corporation, Cleveland
Mutual Manufacturing & Supply Co., *Cincinnati
Verys Brothers, Inc., *Columbus
OREGON
Woodbury & Company, Coos Bay, Eugene, Medford and *Portland
PENNSYLVANIA
Athos Steel Service Co., *Philadelphia
Peter A. Frasse & Co., Philadelphia
Merchant & Evans Co., *Philadelphia
Penna. Industrial Supplies Co., Inc., *Pittsburgh
Potts-Farrington Company, *Philadelphia
RHODE ISLAND
Congdon & Carpenter, *Providence
SOUTH CAROLINA
Southern States Iron Roofing Co., Columbia
TENNESSEE
Southern States Iron Roofing Co., Memphis and Nashville
TEXAS
Allied Metals Inc., *Houston
Mansfield-Lenoir Mfg. Co., Dallas, Harlingen, *Houston, Lubbock, San Antonio and Temple
Vinson Steel and Aluminum Co., *Dallas, Odessa and Amarillo
UTAH
Salt Lake Hardware Co., *Salt Lake City
VIRGINIA
Southern States Iron Roofing Co., Richmond
WASHINGTON
Clingan & Fortier, Inc., Seattle
WISCONSIN
Benjamin Wolff & Co., Milwaukee
TERRITORY HAWAII
American Factors, Ltd., *Honolulu
*Indicates main office

Look Under "Aluminum" in Your Classified Telephone Directory

Your Reynolds distributor is right next door–

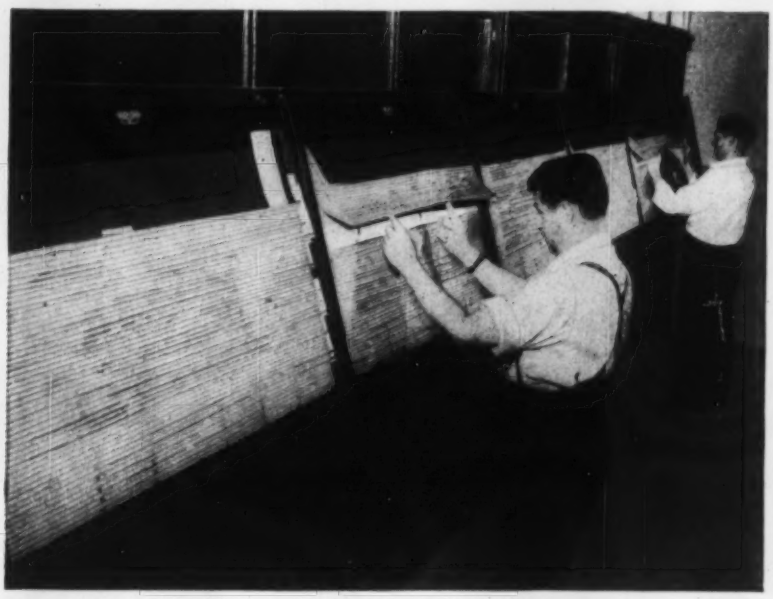
Your partner in production

There's a simple way to order aluminum in just the form you need to meet your production schedules. Pick up the phone and call your Reynolds Aluminum Distributor. Aluminum experts, trained by Reynolds and aided by Reynolds technical staff are always ready with the assistance you need. They're on the job . . . but not on your payroll. These and other distributor services will save you time and money. *Reynolds Metals Company, Louisville 1, Ky.*

Call your nearest Reynolds Distributor, listed in the adjoining column, for his aluminum stock list and assistance on your problems.

REYNOLDS ALUMINUM

MODERN DESIGN HAS ALUMINUM IN MIND



NOW—Still More Effective Machine Loading With New, Simplified Sched-U-Graph System

Profit-conscious manufacturers have long recognized the value of an effective system of machine loading. They have also long recognized that the *most effective* system of machine loading is based on the Remington Rand Sched-U-Graph.

Now, a new, simplified Sched-U-Graph System gives you more accurate and precise machine loading than ever before. With this new system your machine loading will be divided easily into two phases: *Rough Machine Loading*, for scheduling operations as far into the future as is deemed practical; *Fine Machine Loading*, for scheduling in minute detail those operations to be undertaken in the next two weeks.

This new system accomplishes all the following:

1. Indicates available machine capacities for handling any new work that arrives.

2. Reveals and locates bottlenecks and lags.

3. Assures proper sequence of shop orders to meet schedules, thereby keeping Work-In-Process Inventory at a minimum.

4. Controls production by measuring performance against an established plan, resulting in better customer service and lower costs.

In short, the Remington Rand Machine Loading System solves the problem of how to get *the greatest possible production return for each dollar you invest in machines, men, and facilities.* At a glance, this system, utilizing visible charting, tells you the load ahead of each machine, work station, or machine center...the jobs that constitute that load... all scheduled starting and completion dates... how much free machine time is available, and when it is available. All the benefits and methods of the new Remington Rand Rough & Fine Machine Loading System are explained fully in our new free folder. Write today for KD738.

Cut Production Costs With Closer Inventory Control

The absence of complete control of manufacturing inventory results in needless wastes of time, labor, money, and facilities. You can eliminate these wastes by switching now to the Remington Rand System of Inventory Control for Manufacturers.

Profit-eating overstocks mean increased investment and expense, more space for storage, deterioration and obsolescence. Understocks mean lost sales and extra expense for "rush" orders and emergency buying.

For your guidance, Remington Rand offers a new illustrated booklet, "Inventory Control For Manufacturers," which contains all the most modern and effective techniques for controlling inventory and thereby reducing investment in material and clerical record-keeping costs. Circle KD406.

Remington Rand
DIVISION OF SPERRY RAND CORPORATION

Room 1826, 315 Fourth Ave., New York 10

Yes, I'd like to have the literature circled.

KD738 KD406

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State____

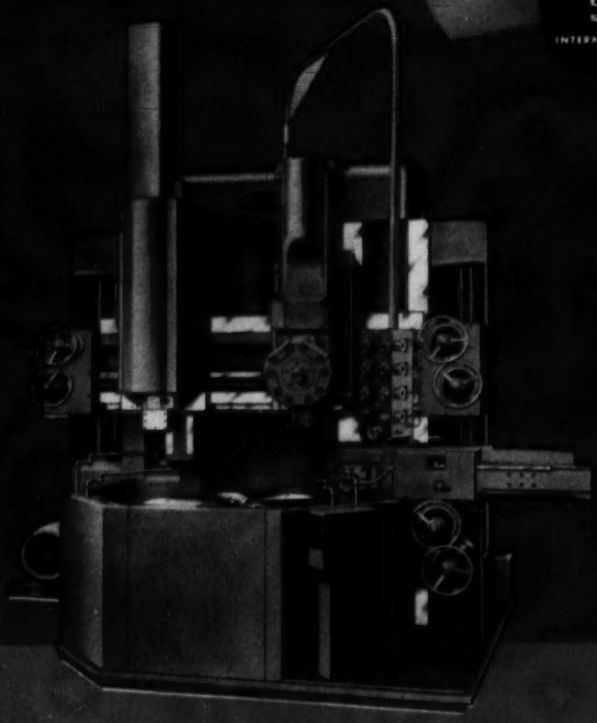
Profit-Building **IDEAS** For Business

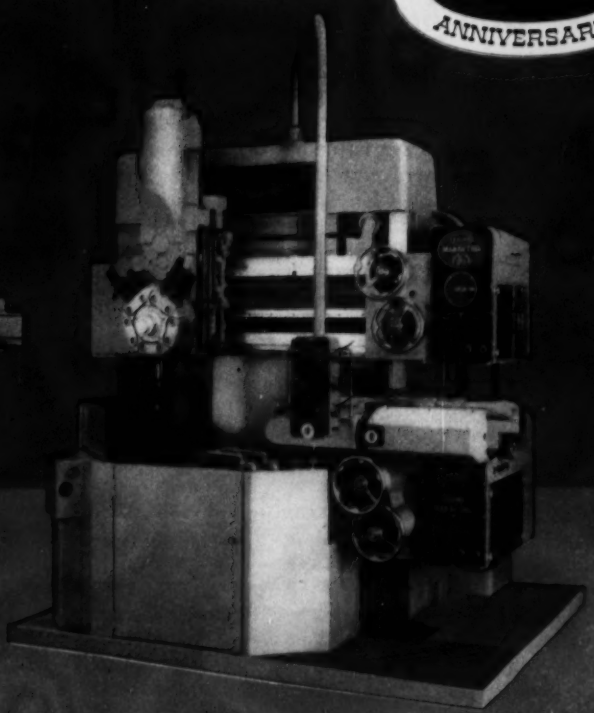
..... you're Invited to .....

BOOTH 1213

THE MACHINE TOOL SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE

SEVENTY FIFTH ANNIVERSARY





CUT MASTER V.T.L., Model 75

In six sizes, 26" to 76"
table diameters in 10" increments.
Various combinations of heads are available.

MAN-AU-TROL, Model 75

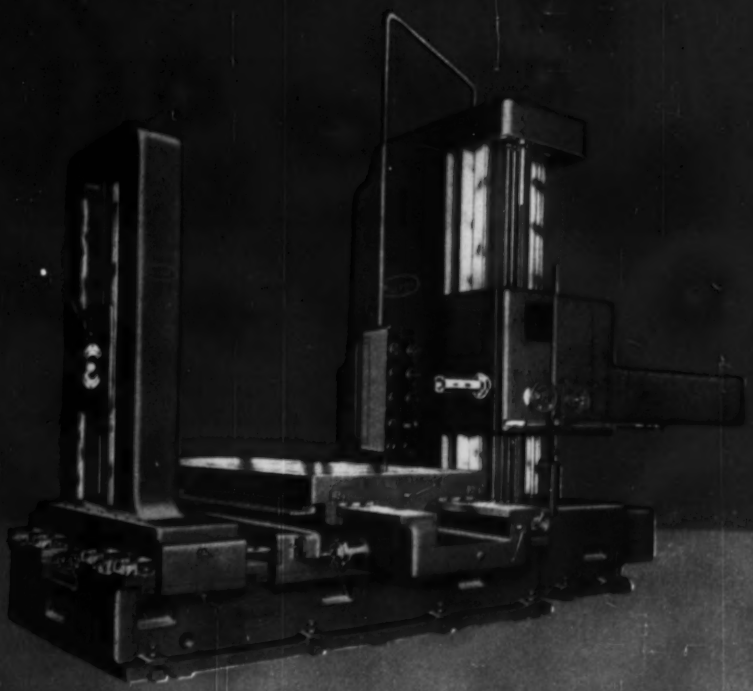
For fully automatic operation—may be applied to any or all heads of Cut Master V.T.L. Model 75 at time of ordering or in your plant at a later date.

You will see the Most Modern Line of Machine Tools available to the . . . Metal Working Industries . . .

THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

WE INVITE YOUR INQUIRIES. CALL OR WRITE US...
OR YOUR NEAREST BULLARD SALES OFFICE OR DISTRIBUTOR

MULT-AU-MATIC TYPE "L"
10" with 6, 8, 12 or
16 spindles, 14" and 18" with
6 or 8 spindles. Automatic loader.



HORIZONTAL BORING, MILLING AND DRILLING MACHINE Model 75
3" 4" and 5" spindle — Available in many combinations of bed lengths, vertical capacity and table size. Automatic positioning.

Meet the BIRDSBORO Roll Specialist...

... he comes to you backed by over a half century of metallurgical, engineering, and production experience. Birdsboro's long record of producing specialized steel, alloy iron, and alloy steel rolls stands behind him to give you individualized roll service. When you want the outstanding performance that means increased tonnage, call BIRDSBORO.

IRON BASE ROLLS: Grainloy, Birdsboro Metal, Curoloy, Superloy, Super Curoloy.

STEEL BASE ROLLS: Diamondite, Birdsboro Special, Birdsboro "30", "40", "50", and "75".

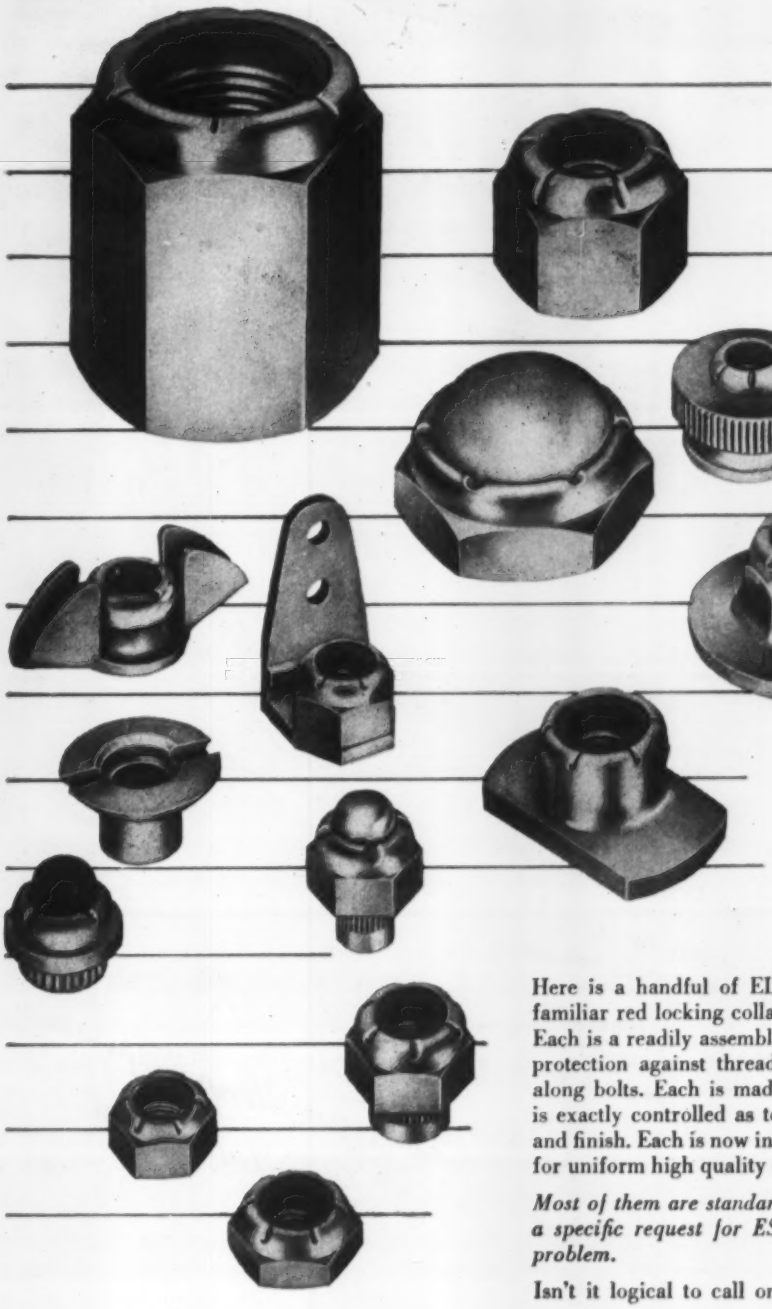
Designers and Builders of:

STEEL MILL MACHINERY
HYDRAULIC PRESSES
CRUSHING MACHINERY
SPECIAL MACHINERY
STEEL CASTINGS
Weldments "CAST-WELD" Design
ROLLS: Steel, Alloy Iron, Alloy Steel

R-10-54

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa. and Pittsburgh, Pa.



What shape is a quality fastener?

Here is a handful of ELASTIC STOP® nuts. Each has ESNA's familiar red locking collar . . . is self-locking and vibration-proof. Each is a readily assembled, one-piece unit. Each provides positive protection against thread corrosion . . . prevents liquid seepage along bolts. Each is made from the finest of raw materials. Each is exactly controlled as to finished dimensions, class of thread fit and finish. Each is now in use on critical applications, with a record for uniform high quality that is unmatched.

Most of them are standard parts. Some originated as the result of a specific request for ESNA's help with an important fastening problem.

Isn't it logical to call on us with your next fastening problem?

ELASTIC STOP NUT CORPORATION OF AMERICA

ESNA

ROLLPIN TRADEMARK

Elastic Stop Nut Corporation of America
Dept. N62-860, 2330 Vauxhall Road, Union, N. J.

Please send the following free fastening information:

☐ ELASTIC STOP nut bulletin ☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name_____ Title_____

Firm_____

Street_____

City_____ Zone____ State____

Ohio Ferro-Alloys Corporation
Canton, Ohio

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MANGANESE PRODUCTS TO SERVE YOUR NEEDS

HIGH CARBON FERRO-MANGANESE — 74-76% & 78-80% MN, 7% C.

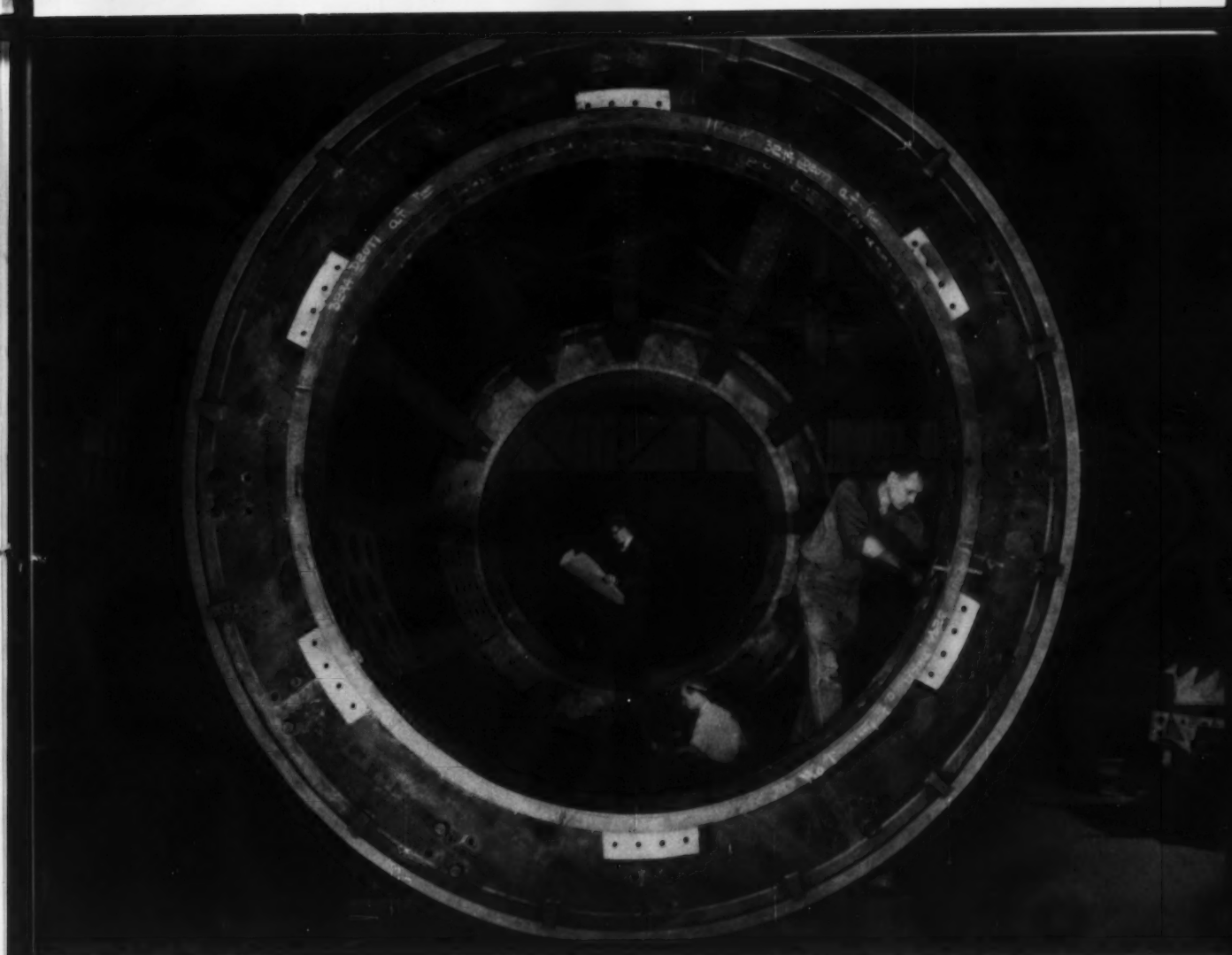
SILICO MANGANESE — 65-68% MN, C. GRADES MAX. 1.50, 2.00 & 3.00

MEDIUM CARBON FERRO-MANGANESE — 80-82% MN, 1.50 MAX. C.

FERRO-MANGANESE BRIQUETS
2 LBS. CONTAINED MN. EACH

SILICO-MANGANESE BRIQUETS
2 LBS. CONTAINED MN. & ½
LB. CONTAINED SI EACH.

Ohio Ferro-Alloys Corporation
Sales Department



SSW forged rings take rugged, heavy wear of Heyl & Patterson coal breakers

SSW forged rings consistently have proven to Heyl & Patterson, Inc., Pittsburgh, they can take the rugged, heavy wear of their coal breakers. They've found Standard Steel's inherent uniform structure and high-quality analysis makes for longer-lasting, failure-proof life of these rings.

This 19-ft. long, 35-ton coal breaker revolves on two 13-ft. diameter endless forged steel tires. It's capable of producing approximately 600 tons of coal per hour, turning at 15 rpm. And Heyl & Patterson can count on these precision-treated rings to withstand effectively abrasion and wear of such heavy-duty operation.

In addition the structural uniformity of these rings enables them to simplify greatly fabrication of their breakers.

You too can improve your product, increase production with Standard Steel forgings. We have a new folder on forged weldless rings and flanges which tells you how. Act today by using the coupon conveniently located below.

Standard Steel Works Division

BALDWIN-LIMA-HAMILTON

Dept. 8846, Standard Steel Works Division
Baldwin-Lima-Hamilton Corporation, Burnham, Pa.

Please send me new Standard Steel Works folder containing detailed information on Forged Weldless Rings & Flanges.

Name _____ Title _____

Company _____

Address _____

City _____ Zone ____ State ____

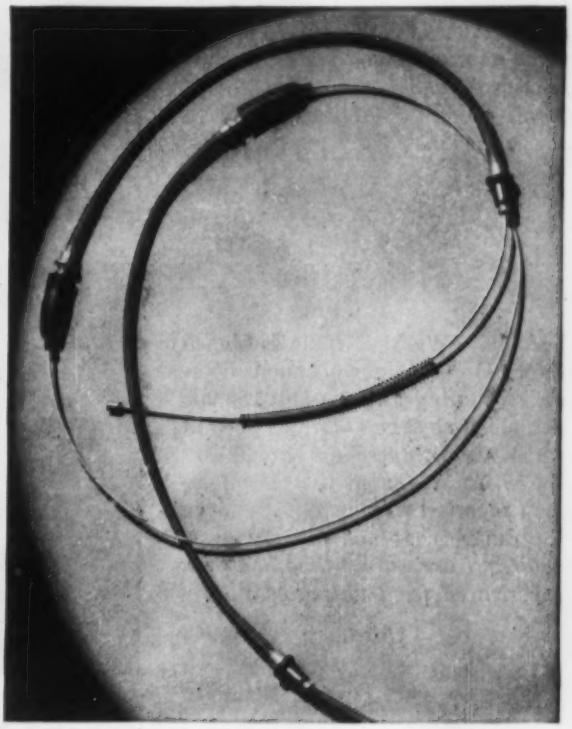
Can you guess what these American

A _____

Quality Springs are used for?

B _____

C _____



ANSWERS

A **CAR-PROOF.** You're looking at the wall of a striking new parking garage just erected in Chicago. American Steel & Wire furnished miles of stainless steel strand that runs continuously from the roof to the ground—where it is stretched tight by means of American Quality Springs. Appearance is breathtaking, and the novel construction prevents cars from rolling off the concrete slabs.

B **ONE LUNG GRAIN BIN.** When grain is stored, it *must* be adequately ventilated. American Steel & Wire produced thousands of these enormous steel "springs" that can withstand tremendous radial loads. In fact, they are laid on the floor of the bin, wrapped with AS&W Insect Screen, then covered with tons of wheat. Air can then be pumped through the tube, and the wheat stays dry and in good condition.

C **YOU USE IT ALMOST EVERY DAY.** It's not a terrifying medical instrument. Rather, this collection of cable, springs, clips and rubber boots is the entire parking brake assembly for a famous automobile. This entire unit was produced by American Steel & Wire.

●Remember, American Steel & Wire can supply *completely fabricated* wire and spring assemblies in quantity. Get in touch with your AS&W salesman . . . take advantage of American Steel & Wire quality—and *price*.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

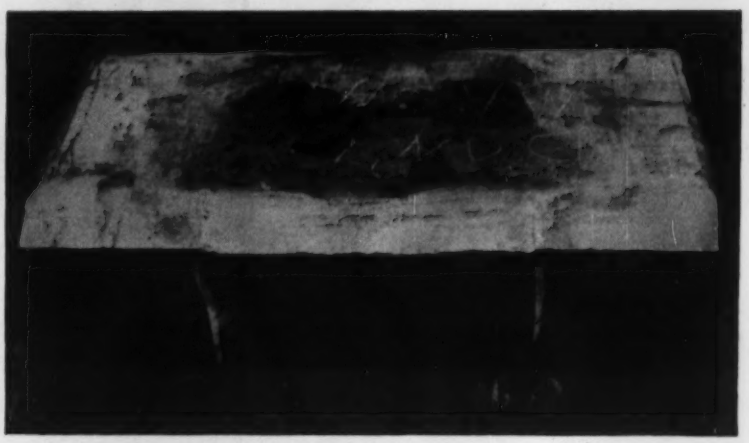
USS

USS AMERICAN QUALITY SPRINGS

UNITED STATES STEEL

Extending die life with Crucible REXWELD. At points of greatest wear, the die face is undercut to a depth of ¼" below finish dimensions. It is then preheated to about 600F and hardfaced with REXWELD VT, using approximately twenty pounds of electrodes. The die is then cooled in air, and its surfaces ground to size. It is then ready for the press.

This REXWELDED die is shown after 11½ turns of continuous operation. During this period 155,000 pounds of steel were forged, 80% of which were *Superalloys S-816 and A-286*. At this point the press foreman reported a slight depression in the die face. *It had already given 400% greater service than had been experienced from untreated dies.*



Crucible REXWELD hardfacing rods keep dies in service 4 times longer...

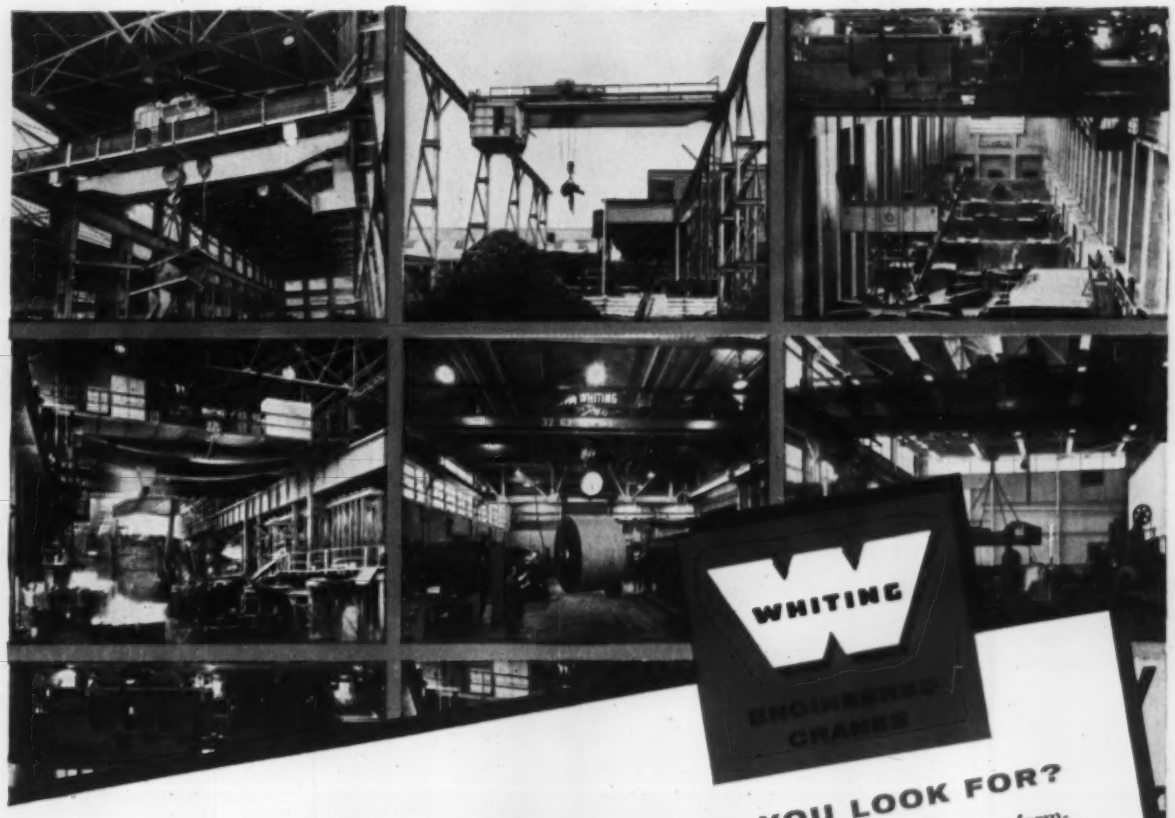
This tungsten-bearing austenitic stainless steel die is designed for forging high-speed and high-alloy steels on a 1000-ton press. Normally, after only 1 to 3 eight-hour turns of production, it must be removed from the press and its surfaces replaned. And successive planing operations quickly reduce the die's thickness to below minimum limits, and it must be scrapped.

But by REXWELDING as shown above, die life is extended 400% or more. For REXWELD adds a surface that is even tougher, more wear-resisting than the original die material – and you can REXWELD again and again.

So when you have an application where surfaces must withstand wear or abrasion, try REXWELD. Your nearby Crucible warehouse has REXWELD low-hydrogen coated electrodes and bare rods in the sizes and grades you need. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America



In Buying a Crane

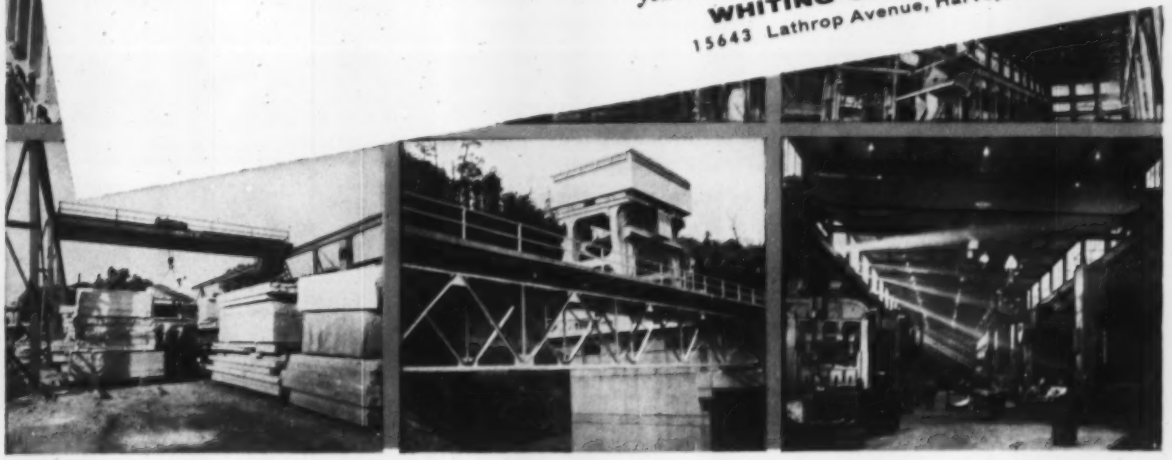
WHAT DO YOU LOOK FOR?

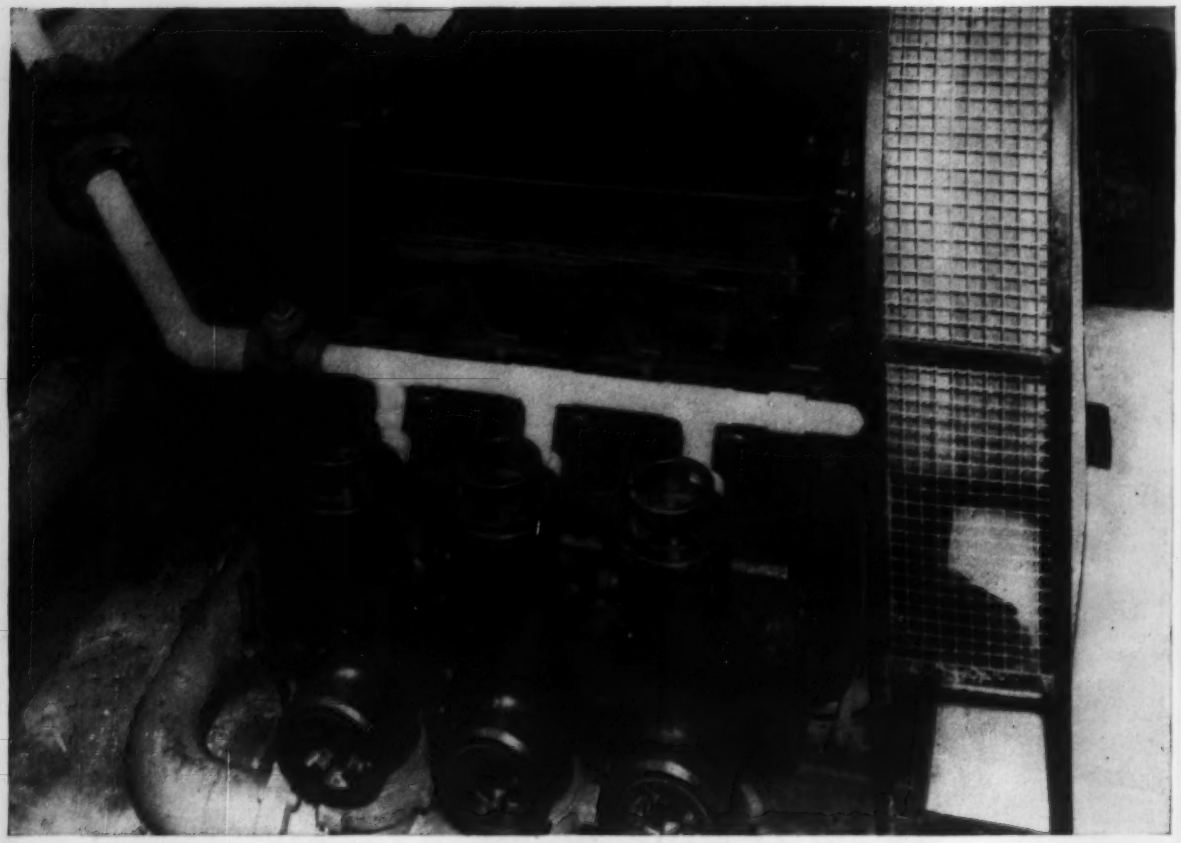
You look for *many* things in a crane . . . performance, high quality of parts, outstanding features, a fair price. But how do you *know* you will get them? *Here's how!* Seek the counsel of a manufacturer who has had many years of crane building experience and who can show you outstanding examples of engineering. Talk over your requirements with men who can advise you of recent crane developments and who have helped plan important installations in firms throughout the world. Do business with people who have a reputation to uphold and who accept responsibility *after* as well as during installation.

Look to Whiting for all of these things. Let us tell you about them now!

WHITING CORPORATION
15643 Lathrop Avenue, Harvey, Illinois

Get the facts now—send for Bulletin No. 80, "Whiting Engineered Cranes."

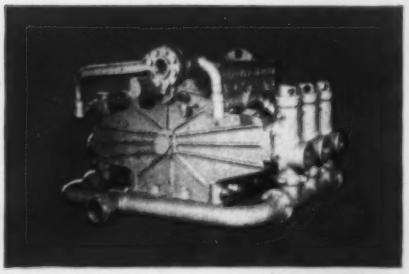




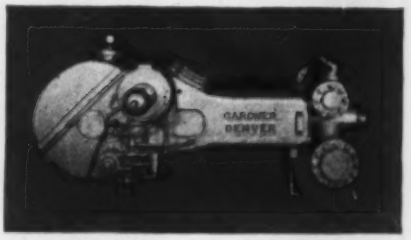
When only high pressures will do, choose Gardner-Denver pumps for reliability

There can be no second-best when you're dealing with the high pressures encountered in hydrostatic testing, de-scaling and cleaning systems, or high pressure hydraulics.

That's why it pays to insist on quality high pressure pumps by Gardner-Denver—engineered by men with many years' experience in high-pressure pumping applications. Pumps fully tested and conservatively rated. Send for additional information.



Model PL-7 six-cylinder plunger pump for pressures to 10,000 pounds. Capacity ranges up to 408 gpm.

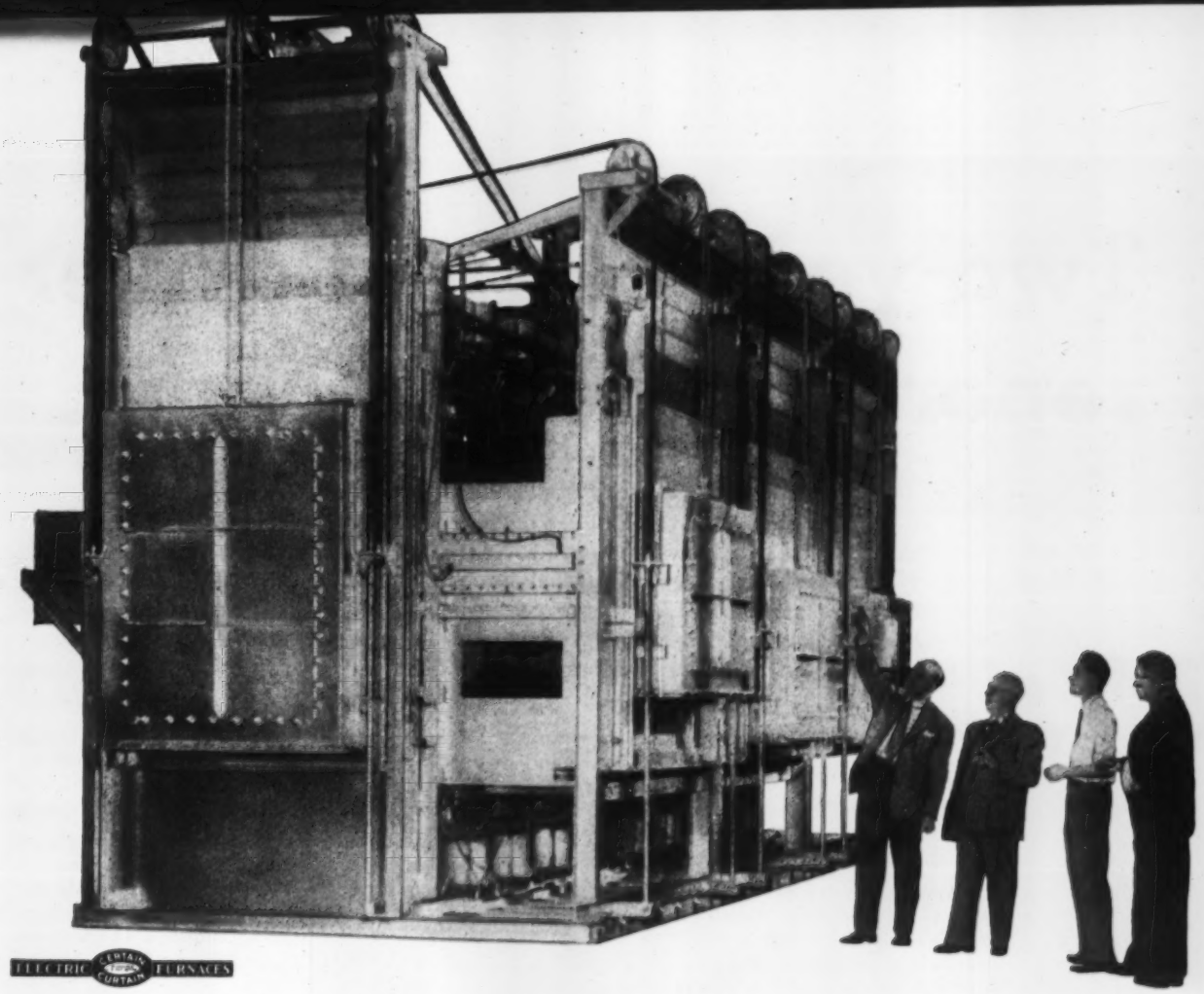


Model PA-8 triplex plunger pump for pressures to 8,000 pounds. Capacity ranges up to 263 gpm.

GARDNER-DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

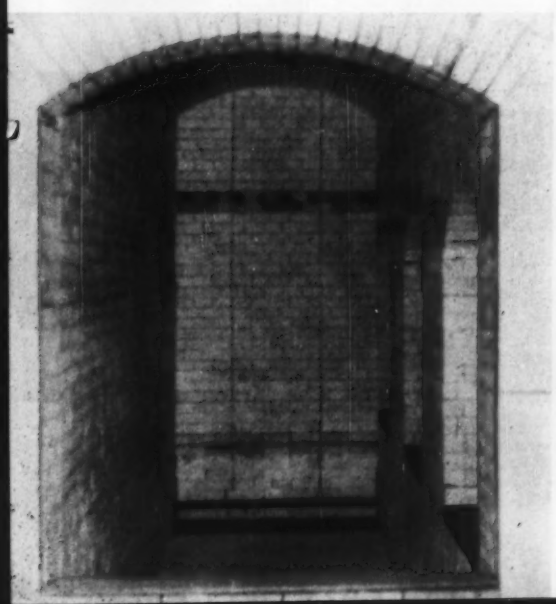
Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario



SUPER REFRACTORIES REDUCE WEIGHT AND GIVE FAST HEAT-UP OF

world's largest electric steel forging furnace

Interior of heating chamber. It will accommodate 10,000-lb. steel forgings. The GLOBAR heating units and the CARBOFRAX hearth and piers had not yet been installed when this photo was taken.



The world's largest controlled atmosphere electric steel forging furnace was recently shipped from the Cranston, R. I. plant of C. I. Hayes, Inc. The big furnace is 17 feet high, 13 feet wide and 25 feet long over-all. It uses 45 GLOBAR® silicon carbide heating elements drawing 600 kilowatts to provide operating temperatures in the 2200°-to-2400°F. range. It will be used to supply billets up to 16 feet in length and 10,000 lbs. in weight for hot forging on a 50,000-ton press, one of the largest in existence.

C. I. Hayes used a carefully-worked-out combination of CARBORUNDUM Super Refractories to keep weight low and cut heat absorption of the lining to a minimum with greatest possible service life under working conditions:

A CARBOFRAX® silicon carbide hearth provides high thermal conductivity, abrasion-resistance, and load-carrying ability at the 2300°F. work chamber temperature.

CARBOFRAX piers have so much hot strength that they can be light and slender yet still furnish adequate support for the heavy furnace charges.

MULLFRAX® W electric furnace mullite skews are nonspalling and provide excellent load-carrying strength at high temperatures, with low heat conductivity.

ALFRAX® BI aluminum oxide brick are used for the sidewalls and roof. One of the most effective of all insulating materials for very high temperatures, these ALFRAX materials keep heat costs down; are light in weight, nonspalling and highly refractory.

This arrangement of CARBORUNDUM refractory materials gives the big furnace low heat storage and fast heating . . . is economical to operate and maintain. These Super Refractories can improve your furnaces in the same way. Why not check up on them now? Write Refractories Division, The Carborundum Company, Perth Amboy, N. J., Dept. W85.

CARBORUNDUM

Registered Trade Mark

Two-year-old test driver reports on "Nylok" Nuts

"Ever watch a two-year-old like me in action? I'll give any piece of equipment a good shakedown and testing. Did it recently on my new Taylor-Tot. Figured it would be a cinch to shake it apart in nothing flat. But I'd never come up against 'Nylok' Nuts before. I gave it the full treatment—bumps, bounces, jars and jolts. The 'Nylok' Nuts held tight. Now I know why 'Nylok' Nuts mean positive locking."

The Frank F. Taylor Company had a young fellow like this in mind when it designed and engineered the Taylor-Tot. At several critical points Republic "Nylok" Nuts are used to assure positive locking even under severe shock, vibration and tension.

Republic "Nylok" Nuts lock whether seated or not. This means painted surfaces and soft metals are protected because "Nylok" Nuts do not have to be pulled up tight. Positive locking is assured in any position wherever you stop wrenching. Yet they can be backed off easily for maintenance or inspection of parts. And then can be re-used.

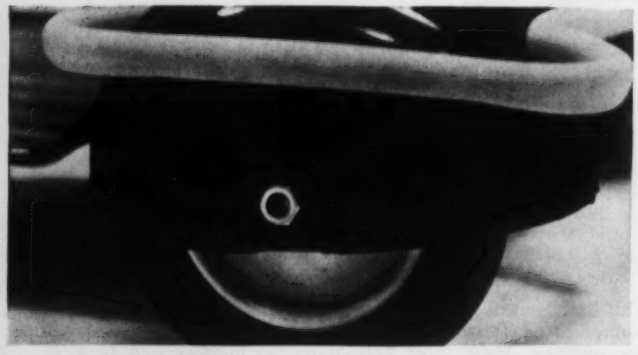
They go on easily, too, because either end is up. No special tools, lubricants or techniques are needed. Use them manually for piece-work. Or feed them automatically at full production speeds.

Think how Republic "Nylok" Nuts might be applied to your product or equipment. Why not make an actual test? Write us for a sample nut indicating size required. Available in Finished Series tapped ¼" thru 1", Finished Thick Series tapped ¼" thru ½", and Heavy Series tapped ¼" thru 1".

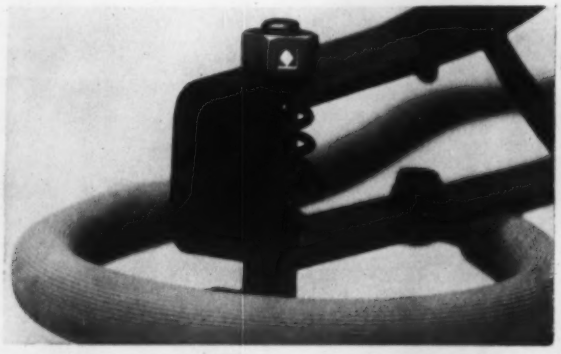
"Nylok" Nuts are but one of more than 28,000 regular types and sizes of high-quality fasteners made by Republic's Bolt and Nut Division.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products



Republic "Nylok" Nuts are used on rear wheels to assure positive locking and for ease of assembly. One-piece, cold-forged nut goes on fast from either end. There is no fumbling to find the right side. No special tools are needed for assembly.



Positive adjustment of spring compression on the Taylor-Tot's shock absorbers is accomplished with Republic "Nylok" Nuts. A nylon plug in one face forces the nut tight against the opposite threads of the stud as the nut is turned on.

MANY BUDDING YOUNG TEST DRIVERS take their first rides in bassinets made of Republic ENDURO Stainless Steel. Use of ENDURO in their construction gives these wheeled bassinets their attractive appearance. Provides adequate strength without excess weight. Makes them easy to clean and keep clean. Assures long life with minimum maintenance. It will pay you to find out more about ENDURO for your product. Mail the coupon.

REPUBLIC STEEL CORPORATION
3120 East 45th Street • Cleveland 27, Ohio

☐ Please send a sample "Nylok" Nut Size _____

☐ Please send more information on ENDURO® Stainless Steel

Name _____ *Title* _____

Company _____

Address _____

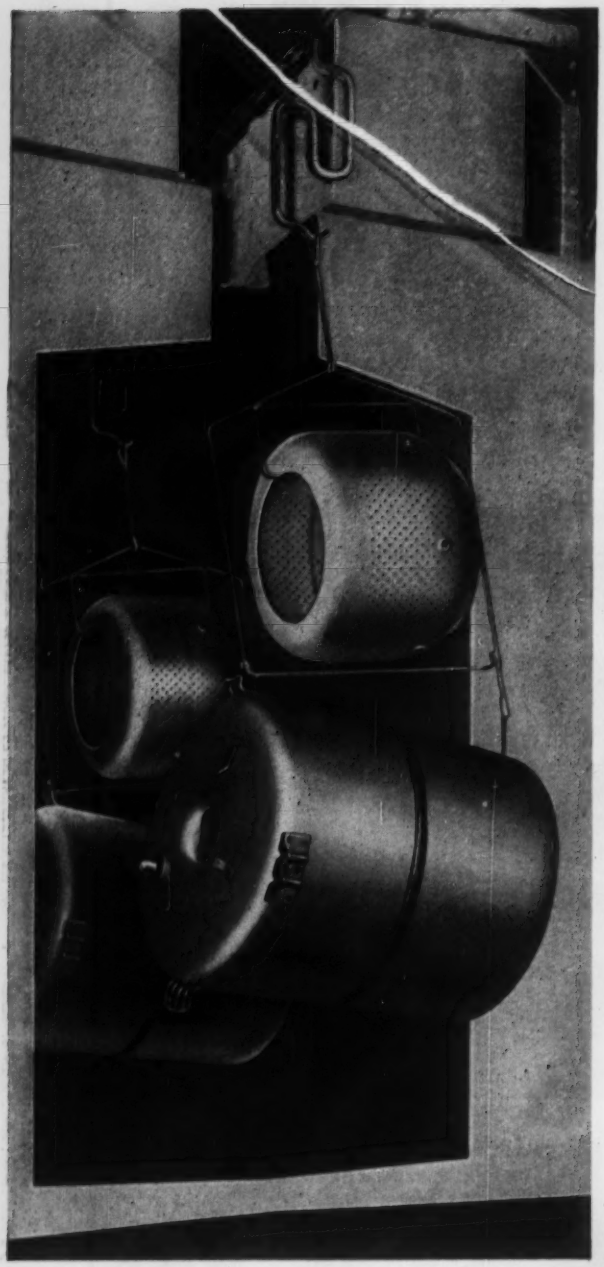
City _____ *Zone* ____ *State* ____

K-6968

HOT H_2SO_4 Corrosion Stopped COLD

by *Carpenter*

Stainless No. 20Cb



Appliance Manufacturer Eliminates Pickling Tank Maintenance Costs

70,000 lbs. of steel parts for automatic washing machines are cleaned daily by a 10% hot sulphuric acid solution at stage five in a nine-stage continuous pickling machine. Taming the H_2SO_4 solution is a 20′x9′x4½′ spray booth lined with Carpenter Stainless No. 20Cb plate.

Rubber lining previously used resulted in frequent and costly breakdowns. Carpenter Stainless No. 20Cb requires no maintenance and shows no sign of corrosive attack after lengthy use. Heating coils submerged in the H_2SO_4 solution, as well as nozzles for the spray system, are also made of this super corrosion-resistant alloy.

Carpenter Stainless No. 20Cb gives cost-cutting freedom from corrosive attack by a long list of other acids, liquids and gases.

See how pipe, tubing, sheet, plate, bar, wire or strip of Carpenter Stainless No. 20 or 20Cb can help you cut corrosion costs. Send now for the NEW Carpenter Stainless No. 20 and No. 20Cb handbook.

MEMBER

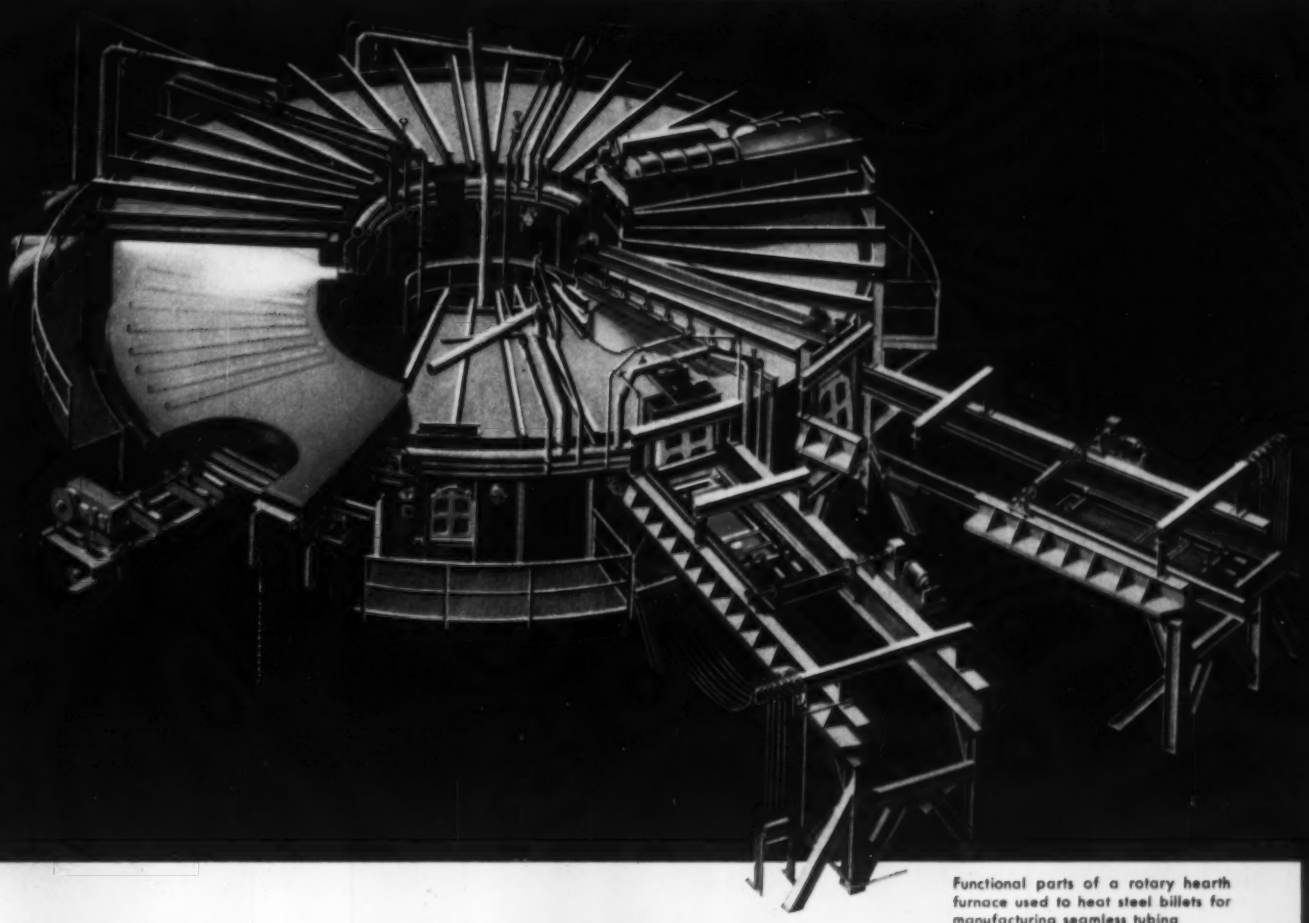
The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

All forms of Carpenter Stainless No. 20 and No. 20Cb are available through any authorized distributor of ▸ ▸ ▸ ▸

Carpenter

Stainless Tubing & Pipe



Functional parts of a rotary hearth furnace used to heat steel billets for manufacturing seamless tubing

It pays to rely on Salem-Brosius for heating or heat-treating furnaces

Shown above is a rotary hearth furnace for which Salem-Brosius has become well-known. This highly efficient, space-saving unit is in general use today for production heating and heat-treating of carbon and alloy steel bars, slabs, round and square billets, shell and forging stock; and similar products in non-ferrous metals such as copper and brass. Most large rotary hearth furnaces in the world have been designed and built by Salem-Brosius or its licensees.

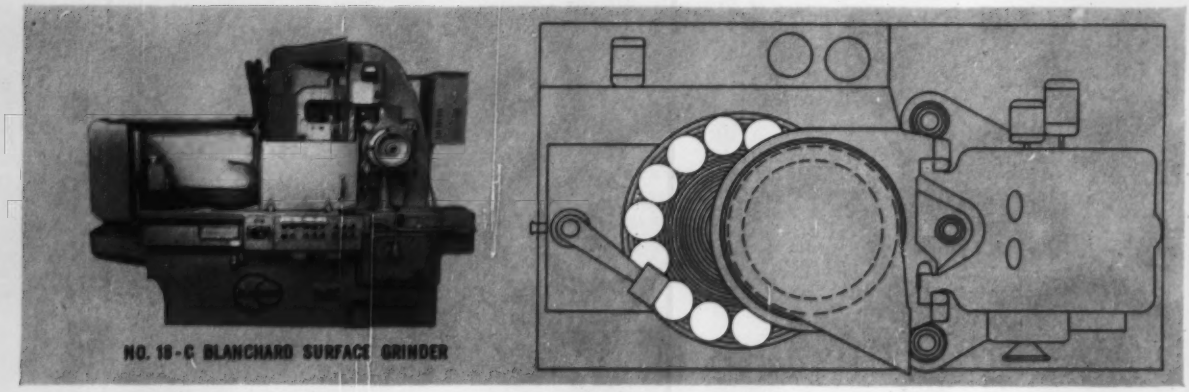
But this famous furnace is only one of the many successful types which the Salem-Brosius engineering staff has designed and constructed throughout the years. The list below will show you a wide variety which may be gas, oil, electric or radiant tube fired and may possess normal or special atmospheres. If you have any heating or heat-treating problems to solve, it will pay you to call on Salem-Brosius. Our engineers will gladly submit a recommendation.

- Soaking Pits
- Continuous Buttweld Furnaces
- Rotary Hearth Furnaces
- Pusher Type Furnaces
- Bell Type Furnaces
- Roller Hearth Furnaces
- Roller Rail Furnaces
- Slot and Other Batch Type Furnaces
- Car Type Furnaces
- Chain or Belt Conveyor Furnaces

SALEM-BROSIUS, INC.

CARNEGIE, PENNSYLVANIA

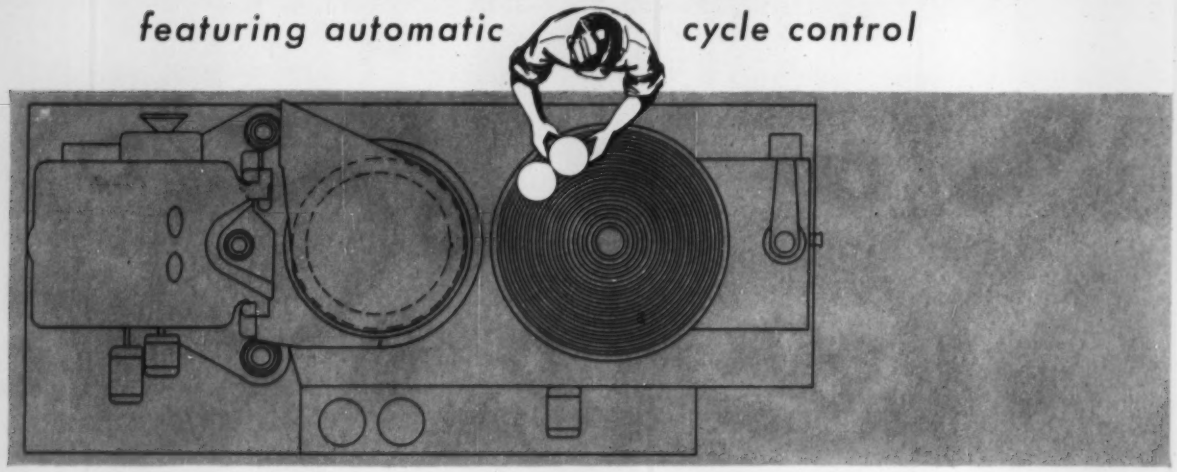
IN CANADA: SALEM ENGINEERING LTD. • 1525 BLOOR STREET WEST, TORONTO 9, ONTARIO



NO. 18-C BLANCHARD SURFACE GRINDER

Plan for more profitable production with this new Blanchard Grinder

featuring automatic cycle control



This great new Blanchard has the speed and simplicity which guarantee economical grinding on a wide variety of jobs.

One operator can easily operate two of these automatic cycling surface grinders. By using the automatic cycle, he can unload, clean and reload one grinder while the other grinds automatically.

The automatic cycle does everything else: moves chuck (30″ or 36″ dia.) to grinding position and starts it rotating; starts wheel rotation and coolant pump; provides rapid wheel approach to work; engages power down-feed at preset rate; changes to fine feed just before finished size is reached; stops feed when work is to size — "sparks" out; raises wheel head; stops wheel, coolant pump and chuck; moves chuck to loading position—demagnetizes chuck.

The No. 18-C also features: push button selection of manual or automatic operation; automatic size control; simple feed and head traverse controls; adjustable dwell timer.

This new Blanchard offers you many new production advantages. Look into them today — write for free catalog showing work done on the No. 18-C.

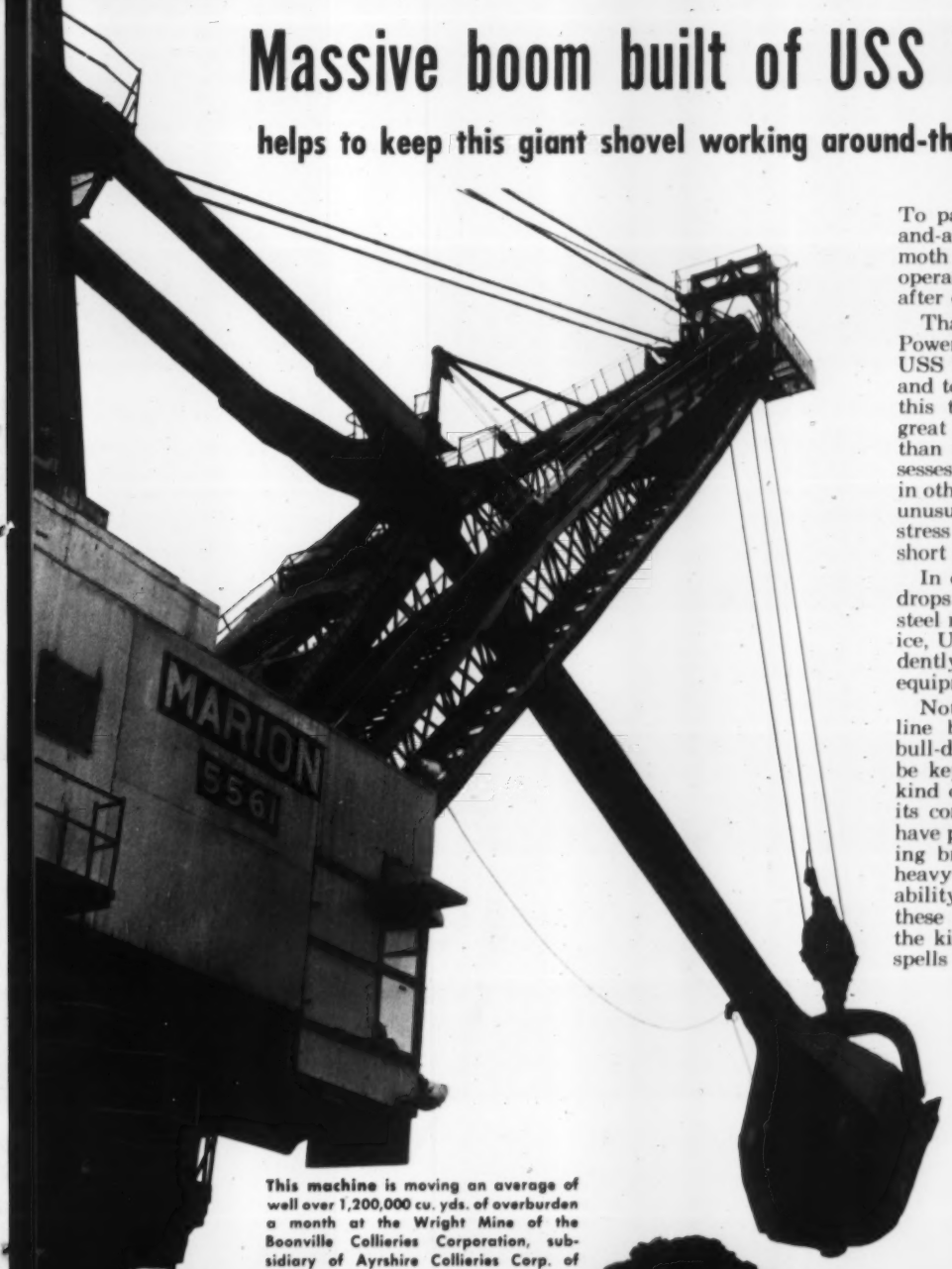
SEE THE 18-C AT THE MACHINE TOOL SHOW CHICAGO, ILL., BOOTH 406

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

Massive boom built of USS TRI-TEN Steel

helps to keep this giant shovel working around-the-clock all year 'round



This machine is moving an average of well over 1,200,000 cu. yds. of overburden a month at the Wright Mine of the Boonville Collieries Corporation, subsidiary of Ayrshire Collieries Corp. of Indianapolis, Ind.

To pay off on the more than a million-and-a-half dollars invested in this mammoth 45-cu. yd. power shovel it must operate *continuously*—24 hours a day, day after day, every month in the year.

That's why the engineers of the Marion Power Shovel Co., Marion, O., selected USS TRI-TEN Steel for all plates, angles and tees in the massive 120 ft. boom. For this tough, versatile steel not only has great strength—a 50% higher yield point than carbon steel—but in addition possesses an important advantage well proved in other similar construction . . . it has the unusual ability to withstand shock and stress at sub-zero temperatures. Here in short is a true *all-weather* steel.

In other words, when the thermometer drops to the point where a less efficient steel might tend to crack and fail in service, USS TRI-TEN construction can confidently be depended upon to keep the equipment profitably on the job.

Not only in booms like this, but in drag line buckets, heavy-duty truck frames, bull-dozers and power shovels that must be kept working hour after hour in any kind of climate, USS TRI-TEN Steel and its companion, USS TRI-TEN "E" Steel, have proved their superiority by minimizing breakdown hazards. In hundreds of heavy-duty applications, where dependability is of prime importance, the use of these high strength steels has resulted in the kind of uninterrupted operation that spells bigger output at lower cost.

NOW AVAILABLE . . . Our new "Design Manual for High Strength Steels" is ready for distribution. This 174-page book is free. It contains comprehensive and practical information that you will find extremely useful in designing your equipment for greater economy and efficiency by the sound use of high strength steels. For your copy, write on your company letterhead giving your title or department, to United States Steel Corporation, Room 4819, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS HIGH STRENGTH STEELS

USS

5-1834

USS TRI-TEN · USS COR-TEN · USS MAN-TEN

UNITED STATES STEEL

"My crew is as good as

UNITED STATES

you can find"

says Alex Janathan,

U. S. STEEL PRESSMAN

● If you were to visit the forge shop at our Homestead District Works, you'd want to see the 7,000-ton press at work. This isn't our biggest press, or our smallest, but it handles some of our most interesting jobs.

The entire crew—press driver, manipulator operator, craneman and helpers are under the direction of Alex Janathan who started in the open hearth when he was 16. If you talked to Alex, here's about the way the conversation might go:

YOU: *"What did you do after you left the open hearth?"*

JANATHAN: "When I left the open hearth, after 3 years, I was first man on the ladle. Then I went to the Heat Treating and Forge Department and worked on the alloy plate shears for 3 years."

YOU: *"And you've stayed in the forge department ever since?"*

JANATHAN: "Yes, at different jobs. After working the shears, I went burning for 3 years—cutting locomotive side frames out of slabs. It was a new idea to replace castings. While I was burning, I got turns as helper on the 3,000-ton press. I worked as press driver, then in '34 was made pressman."

YOU: *"So you've been a pressman now for about 21 years. Did you work on other presses, too?"*

JANATHAN: "I've worked every press we own."

YOU: *"Do you specialize on any one type of product?"*

JANATHAN: "No. I make turbine and generator shafts, every kind of alloy and stainless steel forgings. I also make water wheel shafts, U-plates, half-circles, as well as drop hammer bases and columns."

YOU: *"What's one of your biggest problems while you're forging these big jobs? What do you have to watch for?"*

JANATHAN: "Well, there's the problem of ingots that don't cool evenly while they're on the press."

YOU: *"What causes that?"*

JANATHAN: "When the ingot comes from the furnace, it's evenly heated all the way through, but it's covered with scale. While we work it, sometimes the scale gets knocked off on just one side; so that side cools faster than the side that's insulated with scale. When we forge a piece like that, the hot, or scale side flows outward faster than the cool side, and the piece will not forge accurately."

YOU: *"What do you do then?"*

JANATHAN: "First, we try to remove scale evenly from the ingot. But if it still cools unevenly, we spray the hot side with water until the temperature is even all around. Then the ingot flows the same on all sides. Even ingot heat is awfully important. . . . If it cools too much, the corners start to tear, especially when you're forging alloy and stainless steels. These things are important because we work to such close tolerances. Take a 55″ ingot. When we forge a die block bloom from that ingot we reduce it to 37″ x 21″ and only have ¼″ tolerance."

YOU: *"As far as you're concerned, what's the most important factor in making good forgings?"*

JANATHAN: "First, you have to have good steel. We make our own so that's never a problem. Then you have to have good equipment. We've got the best. But most important is the crew. Mine for example. Turnover is small. Every man knows his job and has been on it for years. I've visited a lot of forge shops, but my crew is as good as you can find."

• • •

When you buy forgings from United States Steel, men like Alex Janathan and his crew work on them. We'll match their skill against the best in the land. For more information on USS Quality Forgings, write to United States Steel, 525 William Penn Place, Room 4819, Pittsburgh 30, Pa.

USS

Quality

FORGINGS

heavy machinery parts—carbon, alloy, stainless

electrical and water wheel shafts

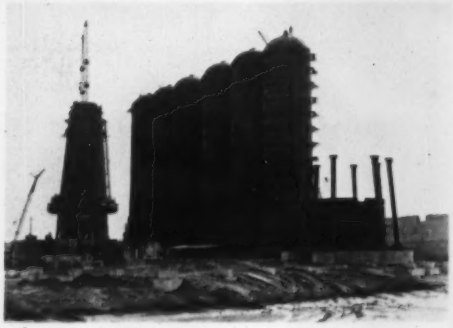
hammer bases and columns

marine forgings

S T E E L

HEAT-RESISTANT CONCRETE is easily placed in blast-furnace stove pads at U.S. Steel Corporation's Fairless Works, Morrisville, Pa. Industrial Concrete made with Atlas Lumnite cement speeds placement . . . reaches service strength within 24 hours!

Blast-furnace stove pads are easy to place with heat-resistant concrete



BLAST-FURNACE STOVES are only one example of the many ways that Industrial Concrete serves the metal industry. Industrial Concrete made with Atlas Lumnite cement gives long, trouble-free service . . . needs less maintenance.

Quickly placed for long, trouble-free service, blast-furnace stove pads are only one of the many ways that Industrial Concrete made with Lumnite* calcium-aluminate cement saves time and cuts costs in metal-industry plants.

Industrial Concrete is easy to make with Lumnite cement and suitable aggregates. It helps speed construction and repair work because it can be poured, troweled, or "shot" in place . . . reaches service strength in less than 24 hours! You get all the placement convenience and structural advantages of concrete with four important extras — high-temperature service (up to 2600°F.), corrosion resistance, wear resistance, and *insulation*.

For added convenience you can use a Lumnite-base castable — packaged mixes of Lumnite cement plus aggregates selected for specific temperature and insulation needs. All *you* do is add water, mix and place. Castables are made and distributed by leading manufacturers of refractories.

You'll find Industrial Concrete made with Atlas Lumnite cement excellent for use wherever heat, corrosion or abrasion are problems. For more information, write Lumnite Bureau, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

OFFICES: *Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.*

*"*LUMNITE*" is the registered trade-mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.*

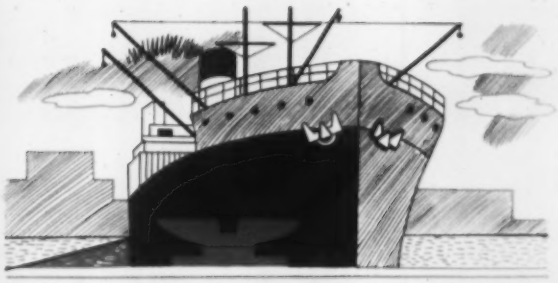
MM-L-108

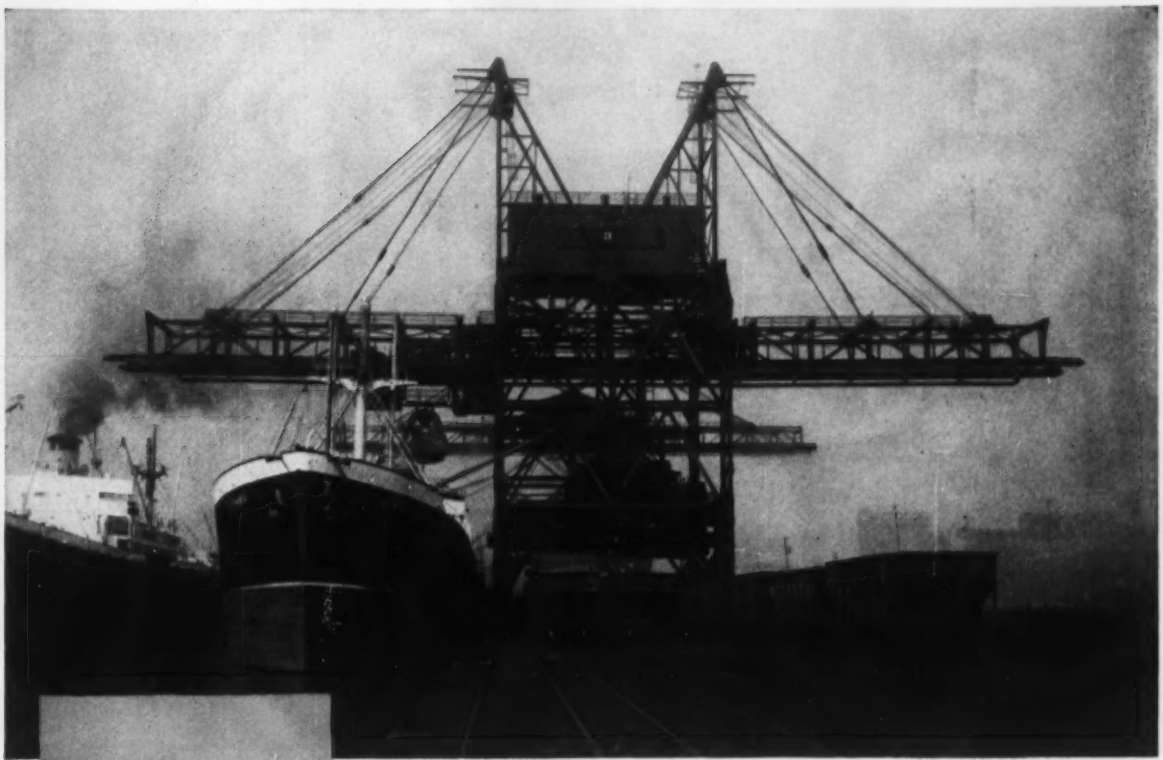
ATLAS **LUMNITE for INDUSTRIAL CONCRETES**

REFRACTORY, INSULATING, OVERNIGHT, CORROSION-RESISTANT

UNITED STATES STEEL HOUR—Televised alternate weeks—See your newspaper for time and station.

you can't show a profit while the cargo's in the boat





Brownhoist equipment speeds material handling in ports all over the world

There's no profit in a shipment of bulk cargo until you get it out of the boat and put it to work for you. The quicker and cheaper you can do this, the bigger your profit will be. BROWNHOIST builds a variety of special equipment for handling bulk materials in large quantities rapidly and efficiently. The 15 gross ton boat unloader you see here, for example, can unload 1200 tons of ore an hour. It has a reach of 70 feet from the face of the dock on either side. The unloader is equipped with adjustable voltage control which gives extremely smooth operation and maximum production. BROWNHOIST also builds traveling bridge cranes, fast plants, storage bridges, car dumpers, locomotive cranes and clamshell buckets. Each machine is specifically engineered to do the job it is designed for as quickly and as economically as possible. For information about BROWNHOIST equipment to meet your requirements, consult your nearest BROWNHOIST representative or write us today.

BROWNHOIST

builds better cranes

175

CLAMSHELL BUCKET

250 TON WRECKING CRANE

COAL-ORE BRIDGE

CAR DUMPER

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GREY IRON CASTINGS

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ONE OF THE NATION'S
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ESTABLISHED 1866

THE WHELAND COMPANY

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MAIN OFFICE AND MANUFACTURING PLANTS

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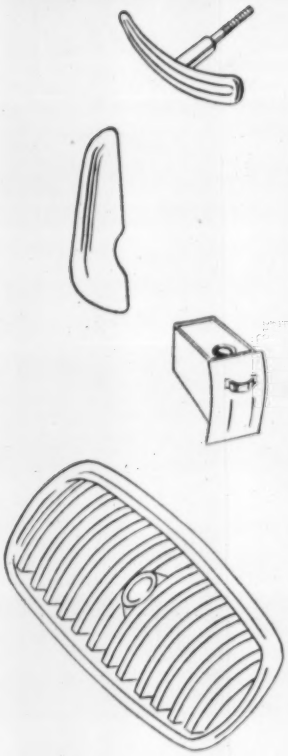
Another field report on "TRICLENE" D



BUMPER GUARDS being loaded into roller conveyor degreaser at Grand Rapids Metalcraft by worker Ben Kolenda.

THOROUGHLY CLEANED with TRICLENE D, bright bumper guards are removed at end of degreaser by James Holliday.

"TRICLENE® D makes vapor degreasing easier than ever . . . now we can put through a larger volume of work,"

Says C. Nesselroad, Mgr., Grand Rapids Metalcraft, Division F. L. Jacobs Co., Grand Rapids, Mich.

"We operate six degreasers—two manual and four conveyorized," continues Mr. Nesselroad, "and since we turn out as many as 150,000 parts per day, we've found we just can't *afford* to have trouble."

That's why Grand Rapids Metalcraft uses TRICLENE D trichlorethylene. With this rugged solvent, they've had consistently thorough, trouble-free degreasing of the automotive stampings they manufacture—bumper guards, brackets, ash trays and grill parts. And with TRICLENE D, their volume of work handled has shown an *increase* . . . and maintenance costs have *decreased*. Furthermore, Mr. Nesselroad concludes, "We've never found a degreasing job that TRICLENE D trichlorethylene couldn't do!"

Locked-in stabilizers give TRICLENE D unsurpassed resistance to *all* major causes of solvent deterioration—heat, light, air, acids and aluminum chloride—yet this rugged solvent contains nothing to harm even delicately machined metal surfaces. TRICLENE D retains its original high purity longer . . . continues to give *brighter cleaning of any metal* job after job, distillation after distillation. And remember, it costs no more!

FOR MORE INFORMATION on TRICLENE D and how it can bring a new standard of efficiency to your vapor degreasing operation, write our nearest District Office. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

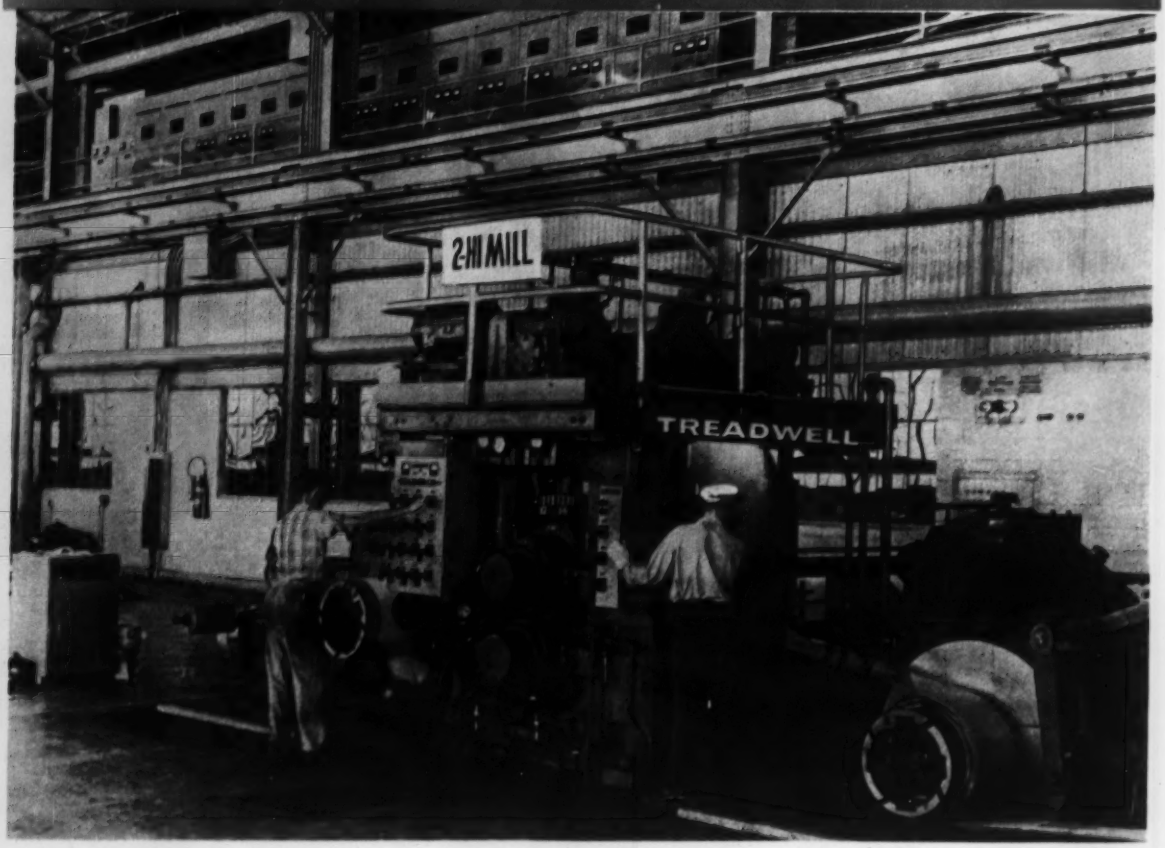
DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

TRICLENE® D

TRICHLORETHYLENE

Treadwell



Temper or skin pass and cold rolling mills for high carbon, stainless and carbon steel strip complete with coiling equipment.

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Mills, Sheet
Mills, Strip (Cold)
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Tables, Transfer
Transfers

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ATlantic 1-2883

before after

Modern Dravo heating saves this plant $6732 per year, frees 3400 sq. ft. of floor space

Sharp increases in heating costs traveled hand-in-hand with growth and expansion at Ideal Electric and Manufacturing Company's Mansfield, Ohio plant.

As manufacturing additions went on over the years, more and more hand-fired coal stoves were employed to heat new areas. Until recently, heating for the seven-acre plant area was handled by thirty-two such units. Heating problems never seemed to cease. With the lack of uniformity in heating, workers either froze or baked. Coal and labor costs (it took almost the full time of 5 men to fire stoves around the clock) never stopped climbing. Stoves and their bins gobbled up more than 4000 square feet of plant space!

When modern Dravo gas-fired, forced-air space heaters were installed, these problems disappeared, and the savings were immediate and substantial. Since eleven Dravo "Counterflo" heaters provided comfortable heat everywhere in the plant areas, 3600 square feet of valuable space was released ("Counterflo" heaters required only 600 square feet). But, more important was the actual gross savings of $6732 made possible last winter, '54-'55, through the use of these Dravo Heaters. When amortizing this new and standby equipment over a 10 year period, a net savings of $2735 per year is realized!

Remarkable? Then you will want to see for yourself what unusual cost-savings and heating efficiency Dravo heaters can bring to your heating systems. Use the coupon below to get complete details. You'll find it always pays to investigate Dravo Heaters!

Dravo Corporation, Department A-1108
Fifth & Liberty Avenues
Pittsburgh 22, Pa.

I am interested in Dravo Heaters for _____

☐ Please send literature
☐ Please have representative call

DRAVO CORPORATION
Pittsburgh 22, Pennsylvania
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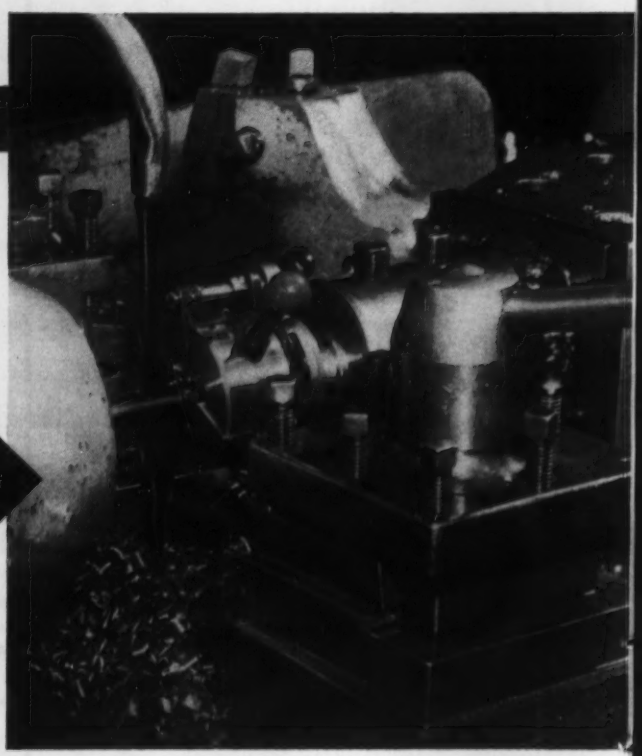
City _____ Zone _____ State _____

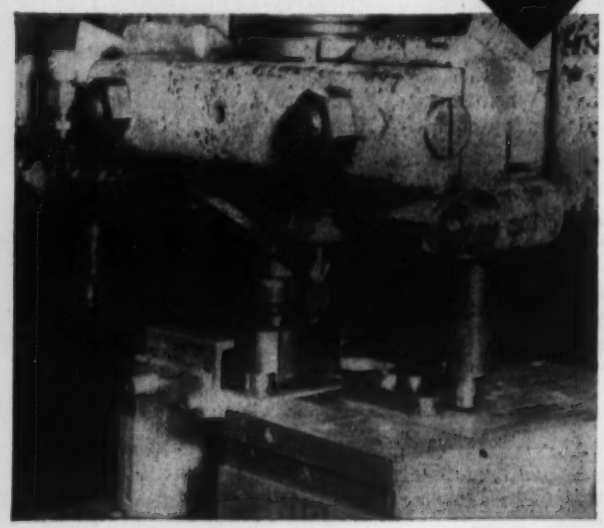
"We found the key to successful machining of ti-stainless--

GULF ELECTRO CUTTING OIL"

says Mr. D. E. Gillmor, Vice President of Gillmors, Inc., Long Island, N.Y.



Improved machining practice on ti-stainless quickly followed a switch to Gulf Electro Cutting Oil in this shop, with results like these: from 20 pieces per tool grind to as many as 45; and finish improved about 43 microns—from 63, the best obtainable with other cutting oils, to as low as 15. For additional information, see page 144 of the September 13, 1954 issue of American Machinist.



Gulf Oil Corporation · Gulf Refining Company

1822 GULF BUILDING, PITTSBURGH 30, PA.

"We increased our tool life 40% and improved the finish 43 microns"

Mr. D. E. Gillmor, Vice President of Gillmors, Inc., Gulf Assistant District Manager Don Gallaher, and Mr. George Glaeser, General Foreman of Gillmors, examine several of the ti-stainless parts machined with Gulf Electro Cutting Oil.

"WE tried scores of cutting oils over a period of months in an effort to increase tool life and get a better finish in machining type 321 titanium stainless steel. Then a Gulf Sales Engineer recommended Gulf Electro Cutting Oil.

"Right away results were phenomenal. Tool life was increased over 40% and surface finish was improved 43 microns."

Gulf Electro Cutting Oil has proved to be the answer to many tough machining problems like this. It contains both free sulphur—held in stable solution—and sulphurized mineral oil, in which the sulphur is chemically combined by an exclusive Gulf process. This combination provides high sulphur activity over the entire range of a cutting operation—gives the tool maximum protection and helps to reduce built-up edge. It also has excellent anti-weld characteristics and extreme load carrying ability.

And remember that Gulf provides a complete line of quality cutting oils that will help you get improved production and longer tool life in all your machining operations. Write, wire, or phone your nearest Gulf office and have a Gulf Sales Engineer recommend the most suitable type for every job.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

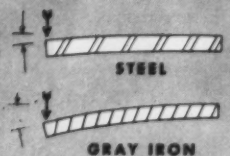
FACTS THAT FIGURE in lower costs

FACT:
Steel is two to three times as strong as gray iron.

STEEL
Tensile strength 61,800 psi

GRAY IRON
Tensile strength 20 to 30,000 psi

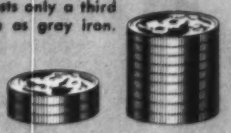
FACT:
Steel is two and one half times as rigid as gray iron.



STEEL

GRAY IRON

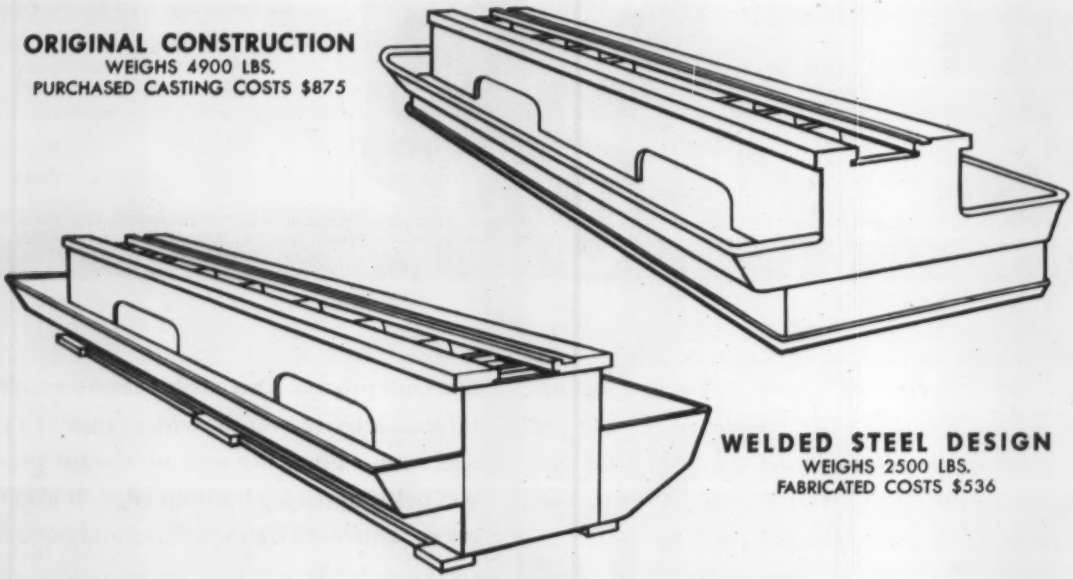
FACT:
Steel costs only a third as much as gray iron.



STEEL GRAY IRON

AND SO... *by manufacturing your products from welded steel, costs can be reduced up to 50%.*

ORIGINAL CONSTRUCTION
WEIGHS 4900 LBS.
PURCHASED CASTING COSTS $875



WELDED STEEL DESIGN
WEIGHS 2500 LBS.
FABRICATED COSTS $536

Design for Steel

CUTS COST 39%... CUTS WEIGHT 51%

COMPARE the two designs for a machine tool base. The steel design takes 2400 pounds less material, yet is actually 40% more rigid. The increased rigidity means more accurate alignment of bed ways . . . greater precision to meet today's close tolerances.

HOW TO PUT WELDesign TO WORK

Lincoln's method for converting designs to welded steel is in WELDesign manual. For details, write . . .

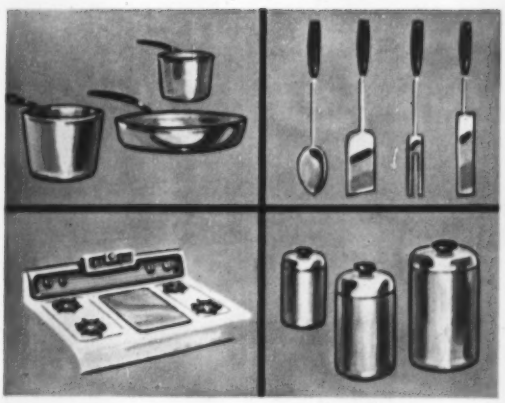
THE LINCOLN ELECTRIC COMPANY

Dept. 1608, Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

modern design specifies stainless steel

McLouth
STAINLESS
Steel
for the home

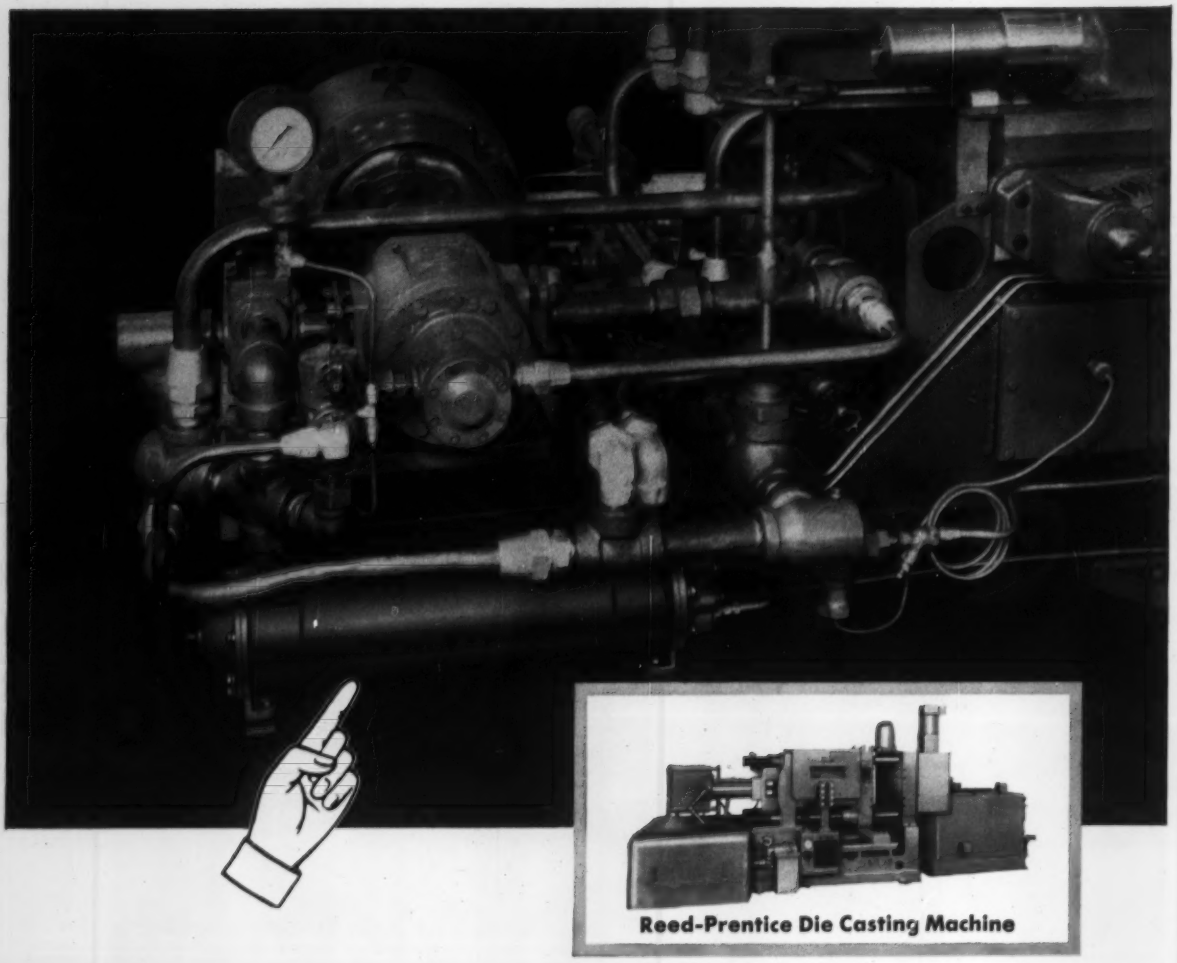


The lady agrees with the architect that her modern, cheerful, Stainless Steel kitchen will be the most beautiful room in the new house. Stainless Steel is the bright, long lasting metal that will not tarnish, is easy to clean and a joy to live with.

For the product you make today and the product you plan for tomorrow specify McLouth high quality sheet and strip Stainless Steel.

McLouth Steel Corporation
Detroit, Michigan

MANUFACTURERS OF STAINLESS AND CARBON STEELS



Reed-Prentice Die Casting Machine

ROSS EXCHANGER COOLS OIL

to assure peak locking pressure

Neatly mounted close to the heart of the hydraulic system, in this Reed-Prentice No. 2 Die Casting Machine, is a compact Ross Type BCF Exchanger. It insures full die locking pressure of 400 tons by maintaining correct oil temperature at all times. *Pump slippage from overheated, thinned oil is effectively prevented!*

Like Reed-Prentice Corporation, other manufacturers of numerous types of hydraulic equipment regularly furnish Ross Exchangers to assure safe, dependable oil cooling.

Some of their reasons for doing so:

- Ross Exchangers, in addition to being top-rated for thermal efficiency, are ruggedly built to withstand punishing hydraulic shock.
- They're readily obtainable from stock in a wide range of pre-engineered, fully standardized sizes to meet most needs.
- Convenient, accessible connections facilitate installation.

For detailed information, request Bulletin 1.1K5.

KEWANEE-ROSS CORPORATION
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
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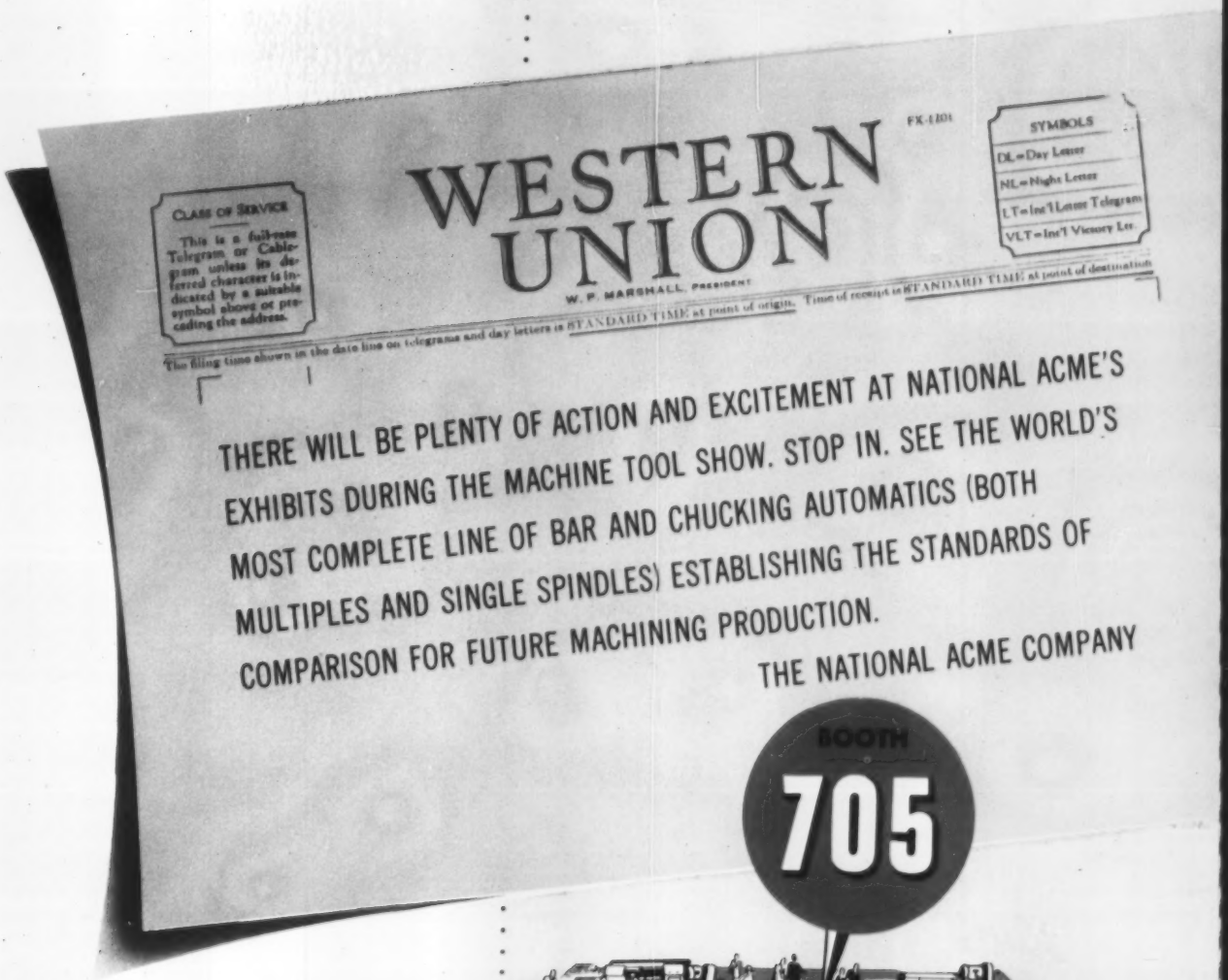
Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

Curtain going up...

...on the **WORLD'S BEST INVESTMENT** in action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W. P. MARSHALL, PRESIDENT
FX-1101
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SYMBOLS
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LT = Int'l Letter Telegram
VLT = Int'l Victory Ltr.
The filing time shown in the date line on telegrams and day letters is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination
THERE WILL BE PLENTY OF ACTION AND EXCITEMENT AT NATIONAL ACME'S EXHIBITS DURING THE MACHINE TOOL SHOW. STOP IN. SEE THE WORLD'S MOST COMPLETE LINE OF BAR AND CHUCKING AUTOMATICS (BOTH MULTIPLES AND SINGLE SPINDLES) ESTABLISHING THE STANDARDS OF COMPARISON FOR FUTURE MACHINING PRODUCTION.
THE NATIONAL ACME COMPANY
BOOTH
705
CHICAGO

also check in at BOOTH **324** for equipment to reduce threading costs and for electrical components to assure dependable automatic control

See how time is saved on ACME-GRIDLEYS

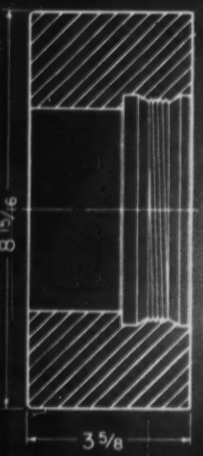
. . . at the Machine Tool Show

BOOTH **705**

SEPTEMBER 6 THROUGH 17

See in action 8 of the world's most versatile and productive multiple and single spindle automatics tooled up on parts such as you are now making or may make tomorrow. These Acme-Gridleys are tooled with carbides, high speed, or a combination of both — depending on the individual job analysis. Compare these speeds with your present methods. If you are not now using Acme-Gridleys, we think you'll get a new conception of metal turning production.

12-inch, Single Spindle ACME-GRIDLEY Chuck Type Fully Automatic Turret Lathe



FINGER HOLDER — First Operation

MATERIAL—1020 Steel Forging

MACHINE TIME—3 minutes

NO. OF OPERATIONS—11, including tapping 5/8"-16 with circular chaser collapsing tap. Carbide tooling on all operations except tapping.

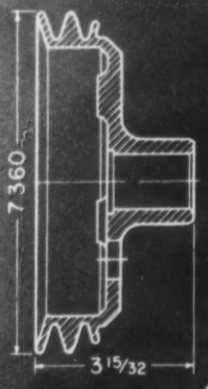
NOTE—Second operation on a Chuck-Matic (See below).

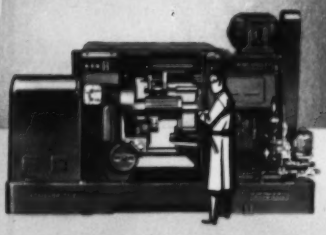
CYLINDRICAL IRON PULLEY

Machine arranged with double indexing to perform 1st and 2nd operations simultaneously in one setup.

MACHINE TIME—49 seconds

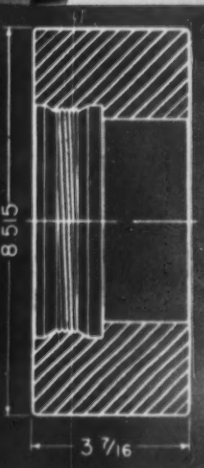
NO. OF OPERATIONS—26; 13 on each end, using carbide tooling all the way





8-inch, 8-Spindle ACME-GRIDLEY Chucking Automatic

12-inch, Single Spindle ACME-GRIDLEY Chucker (CHUCK-MATIC)



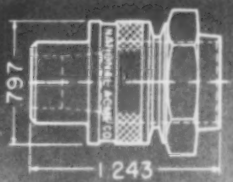
FINGER HOLDER — Second Operation

MATERIAL—1020 Steel Forging

MACHINE TIME—1 minute, 40 seconds

NO. OF OPERATIONS—8, using carbide tooling throughout.

1 ¼-inch, 8-Spindle
ACME-GRIDLEY
Bar Automatic



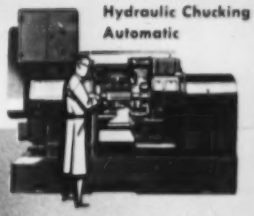
SPARK PLUG SHELL

MATERIAL — Steel — Open Hearth, Grade A Leaded.

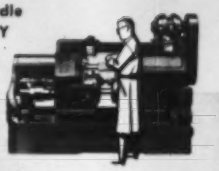
MACHINE TIME—4.5 seconds; gross production, 800 pieces per hour

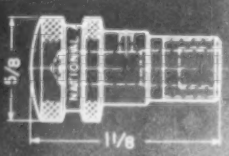
NO. OF OPERATIONS—16, using a combination of carbide and high-speed steel tools as best suits each operation.

5 ¼-inch, 6-Spindle
ACME-GRIDLEY
Hydraulic Chucking
Automatic



1-inch, 6-Spindle
ACME-GRIDLEY
Bar Automatic



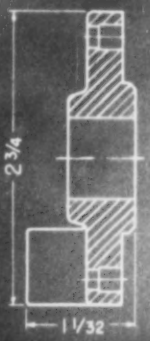


RETAINING SCREW

MATERIAL—Commercial Brass

MACHINE TIME—1.78 seconds; gross production, 2000 pieces per hour

NO. OF OPERATIONS—11, including tapping, threading and spindle stopped for cross drilling.

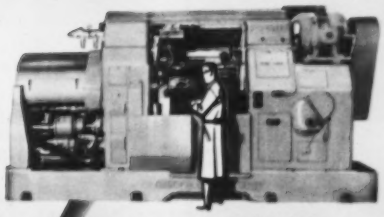


HOUSING CAP

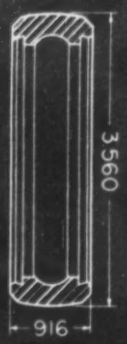
MATERIAL—Bronze Casting

MACHINE TIME—8 seconds

NO. OF OPERATIONS — 11, with combination of carbide and high speed steel tooling, as determined by job analysis.



4-inch, 8-Spindle
ACME-GRIDLEY Bar Automatic



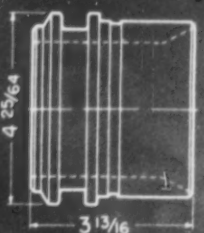
BEARING RACE

Two pieces produced simultaneously

MATERIAL—52100 Steel Tubing

MACHINE TIME — 21 seconds (two pieces); gross production 340 pieces per hour.

NO. OF OPERATIONS—12; 6 on each piece, with carbide tooling throughout.



FINGER HOLDER SPOOL

MATERIAL—4620 Steel Tubing

MACHINE TIME—3 minutes; gross production, 20 pieces per hour

NO. OF OPERATIONS—15, including angular turning attachment. Carbide tooling

4 ¾-inch, Single Spindle ACME-GRIDLEY
Bar Type Fully Automatic Turret Lathe

THE NATIONAL ACME COMPANY CLEVELAND 8, OHIO

Remember — **You can't do today's job with yesterday's tools — and have a profitable tomorrow**

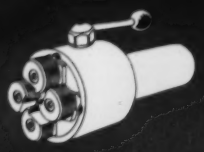
for equipment that will **REDUCE THREADING COSTS . . .**
or for electrical components to assure
DEPENDABLE AUTOMATIC CONTROL

take a close look at National Acme exhibits in

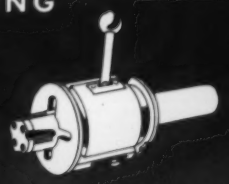
BOOTH **324**

From the **THREADING DIVISION**

THREAD CUTTING



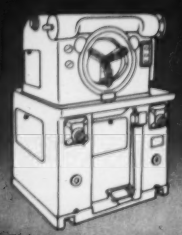
National Acme VERS-O-TOOLS — Threading and Hollow Milling Heads. (Revolving and Non-Revolving Types)



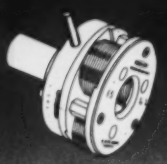
National Acme COLLAPSING TAPS — with Ground Thread Circular and Blade-Type Chasers

BASIC TOOLS FOR LOWEST-COST THREADING

THREAD ROLLING



National Acme THREAD ROLLING MACHINE



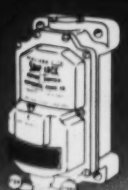
National Acme "FETTE" SELF-OPENING THREAD ROLLING HEAD

From the **ELECTRICAL MANUFACTURING DIVISION**

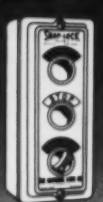
National Acme LIMIT SWITCHES — SNAP-LOCK Heavy Duty Type (Illustrated). Also available in Super-sensitive (Light Contact) Type

National Acme SOLENOIDS Push and Pull Type—AC or DC

BASIC COMPONENTS FOR AUTOMATIC CONTROL



National Acme MOTOR STARTER SWITCHES



National Acme PUSH BUTTON CONTROL STATION SWITCHES

THE NATIONAL ACME COMPANY

170 East 131st Street • Cleveland 8, Ohio

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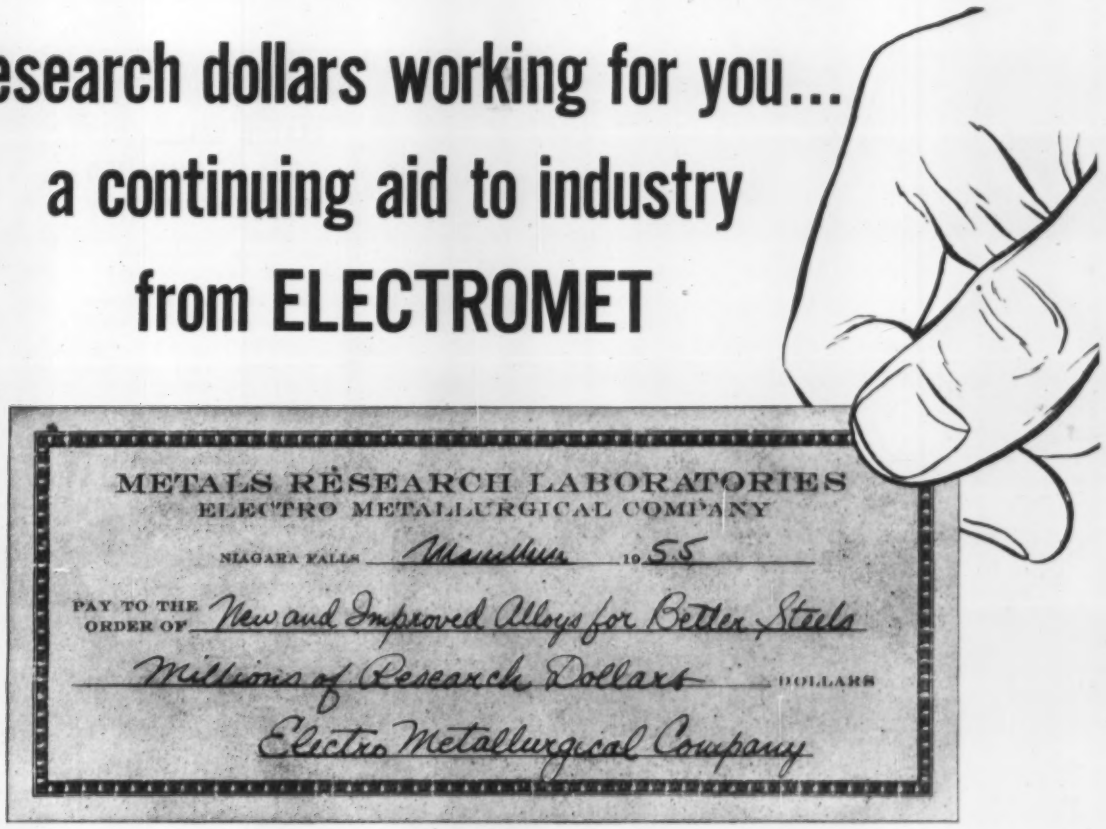
Research dollars working for you... a continuing aid to industry from ELECTROMET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Millions of Research Dollars DOLLARS
Electro Metallurgical Company

ELECTROMET's *research laboratories spend millions of dollars to develop new and improved alloys for better steels—and you receive the benefits.*

More than 300 skilled research scientists, engineers, and technicians work in ELECTROMET's Metals Research Laboratories on the solution of metallurgical problems. They develop new and improved ferro-alloys and metals, better ways of using them, and new and improved alloy steels and irons.

ELECTROMET conducts this continuing research program as a bonus for you, to provide high-quality ferro-alloys and valuable technical service.

You can profit from this continuing research program. For help on your problems in the use of ferro-alloys or the metallurgy of alloy steels or irons, please contact the nearest ELECTROMET office listed below.

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Electromet
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LEADED ALLOY CUTS COST OF FINISHED PARTS...HERE'S WHY
Increases production as much as 200%.
Cuts 25% to 75% faster than comparable standard analyses.
Lengthens tool life from 100% to 300%.
Retains strength—lead has no known effect on mechanical properties.
Machines to excellent finish, exceptionally bright and smooth.

Announcing NEW RYCUT 50, *a leaded alloy*

fastest machining alloy steel in its carbon range

Here's a medium carbon alloy steel which for the first time combines the high mechanical properties needed in heavy duty applications with the free-cutting characteristics of a carbon manganese steel.

Shop after shop has saved up to 75% in machining time, lengthened tool life by as much as 300% and increased production up to 200% after switching from a standard medium-carbon alloy to New Rycut 50.

The secret lies in the addition of a very small amount of lead (.15% to .35%) by a patented process. Finely dispersed, the lead acts as a lubricant between steel and cutting tool—giving greatly increased machinability without known effect on mechanical properties—the hardenability of New Rycut 50 compares with that of AISI 4150.

You can get quick shipment of New Rycut 50—annealed or heat treated in rounds of many sizes—from your nearby Ryerson plant. For worthwhile savings, try this remarkable alloy in your shop for production or maintenance applications.

Also on hand at Ryerson—two other leaded alloys: Low carbon Rycut 20 and medium carbon Rycut 40. Also Ledloy, the fastest cutting carbon steel.

Principal products: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery & tools, etc.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

STEEL

August 15, 1955

Metalworking Outlook

Ford Gets the Jump

The completely new superpowered Lincoln will hit dealers' floor Sept. 8. Face-lifted Fords and Mercurys will be out three weeks later, to be followed shortly by the reborn Continental. Ford will be out ahead of General Motors with new models by 30 to 60 days. First public showing of Buick, for instance, will be Nov. 8.

No Limits on Scrap Exports

Watch for the Bureau of Foreign Commerce in the Commerce department to continue with the present iron and steel scrap export licensing system. Under the method, no quantitative limits are placed on exports. After a look at preliminary figures for June, many people thought limits should be set. The data showed a staggering 612,000 tons of the material were shipped abroad. But those figures proved erroneous—only 510,000 tons were exported—so complaints have subsided. Easing the demand for American scrap are higher European prices that are bringing out more home material. Even at 510,000 tons, June exports may prove to be the peak shipments in 1955.

Problem on Proxies

Look for the Securities & Exchange Commission to put more teeth into regulations controlling proxy fights. SEC Chairman J. Sinclair Armstrong says he's pushing for: 1. "Stop order" powers in the mailing of proxy statements containing false or misleading information. 2. Full disclosure of stock ownership and association to reveal people backstage in proxy fights. The suggested revisions follow the SEC's investigation of the Montgomery Ward-Louis E. Wolfson battle. Findings will be made public after they're submitted to the Senate Banking Committee this fall.

Report on Freight Cars

In case of war, the first three years of full mobilization would require an increase of 215,000 freight cars over the existing 2,030,000. That's the essence of a report to the Office of Defense Mobilization. Needed would be 112,000 new cars in the first year, 118,000 in the second and 90,000 in the third. The total of 320,000 would allow for scrapping of 35,000 in each of the three years, bringing the net increase to 215,000. The report suggests that railroads begin at once to install a minimum of 60,000 new cars a year and that they consider setting up a revolving stockpile of critical freight car components.

Aircraft Dispersal?

Effects of the Air Force's emphasis on dispersal of aircraft manufacturing facilities to inland areas are turning up. Examples: Boeing will choose

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a site in either Denver or Salt Lake City, Utah, for a plant to produce a guided missile. Lockheed has suspended plans for a $10-million guided-missile research, engineering and test facility at Van Nuys, Calif. Northrop will built a pilot plant for work on target drones and missiles at El Paso, Tex. Menasco Mfg. Co., maker of landing gear, will build a $5-million plant in the Dallas-Ft. Worth area.

Fast Write-Off Decision Ahead

ODM will make a decision in the next week or so on what to do about fast amortization. Direct defense or direct-defense-supporting projects are certain to continue to get the tax benefits. The tough decision concerns the defense-related expansion plans. In any event, far fewer certificates of necessity will be granted from now on.

The Real Estate Market

Prices of plant and warehouse locations are higher than they were a year ago, according to a survey by Society of Industrial Realtors. Other findings: Prices of one-story industrial buildings are stable; prices of multistory buildings have weakened further.

Defense Spending Shifts

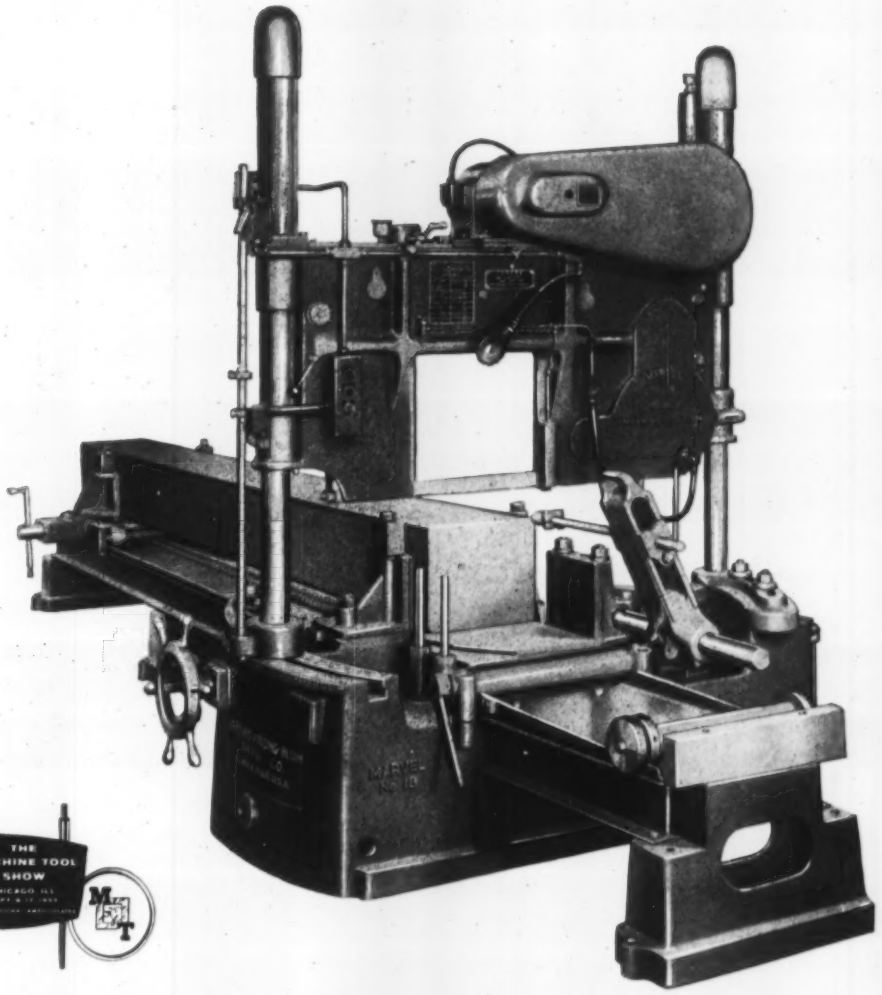
Defense spending in fiscal 1956 will be about $40.5 billion, slightly under the $41.1 billion of fiscal 1955. But there will be significant changes in where the money will be spent. Aircraft expenditure will decline from $8.2 billion to $7.3 billion; tank, truck and other vehicle spending from $767 million to $647 million; communications equipment expenditures from $707 million to $695 million. Increases will come for ships ($903 million to $966 million), missiles ($529 million to $756 million), ammunition ($1 billion to $1.2 billion), construction ($1.5 billion to $1.8 billion) and atomic energy ($1.9 billion to $2 billion).

Union Shop Protest

Nonunion employees of General Motors Corp. in Indianapolis and Anderson, Ind., are in court challenging the legality of the union shop provision in the new contracts between GM and the United Auto Workers. The provision would require nonunion employees to join the UAW by Aug. 26 or lose their jobs. Their complaint says the union shop provision is a violation of the Indiana constitution and state laws.

Straws in the Wind

B. J. Klarman, organizer of the new Western Empire Steel Corp., says details about the company's plans will be announced in about a week . . . Ford Motor Co. is setting up a $1-million fund to make annual "atoms-for-peace" awards to nuclear energy scientists . . . Atomic Energy Commission will negotiate with Detroit Edison Co. and associates and Commonwealth Edison Co. and associates to build atom power plants; but it turned down the proposals, in their present form, of atom power projects by Consumers Public Power District and Yankee Atomic Electric Co.



THE MACHINE TOOL SHOW

No Job too big or too tough . . .

for MARVEL "*Giant*" Hack Saws

These giant MARVEL Hydraulic Hack Saws (No. 18, Capacity 18" x 18"; and No. 24, Capacity 24" x 24") were *basically* designed for rapid and economical cut-off of BIG WORK. They are not merely "conventional" designs "stretched" to big capacity. They are truly designed and built with the ruggedness and rigidity necessary to withstand the rough treatment of sawing big work, even though the work is in the "toughest of the tough" alloys.

They are reliably fulfilling the cut-off requirements in innumerable steel mills, forge shops, structural shops, warehouses, and machine shops, with assured low tool cost and minimum kerf loss of steel.

In addition to cutting-off, they are reducing costs by eliminating further machining operations. Heat treated die blocks are being reclaimed for re-sinking by sawing off the worn face; columns, beams, pipe, and tubing are being sawed to *finished*, square ends, eliminating milling; angular sawing is done conveniently by swinging the upper structure on the base, to any angle up to 45 degrees—*without moving the work*.

Contemplating the modern trend toward ever tougher steels and larger sizes, these are the logical sawing machines to buy, not only for today's needs but for tomorrow's as well.

Write for Catalog

MARVEL *Metal Cutting* SAWS
Better Machines—Better Blades

ARMSTRONG-BLUM MFG. CO. 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

One of several
20-ton Ni-Hard drop balls used for optimum fragmentation in reclaiming steel scrap from slag by Heckett Engineering, Inc., of Butler, Pa. Cast by United Engineering & Foundry Co., Canton, Ohio.

How to lick the job of reclaiming scrap

—use NI-HARD

LOOK AT TYPICAL RESULTS obtained by using NI-HARD drop balls. At the Vulcan Mold and Iron Company plant in Latrobe, Pennsylvania, for example . . . .

Since October 1952, a 6-ton NI-HARD ball has broken up an average of 250 tons of cast iron scrap, daily, five days a week. So far, this represents some 10 to 1 improvement over unalloyed cast steel balls previously used.

Back in May 1953, at Vulcan's plant in Lansing, Illinois, an unalloyed ball split after 3 months' use. But its replacement . . . a 10-ton Ni-Hard ball . . . is still smashing scrap.

Although particularly notable for abrasion resistance, Ni-Hard is tougher than its hardness indicates. And this means long life for Ni-Hard drop balls.

Wherever you encounter severe abrasion . . . specify Ni-Hard. Send us details of your problem. Let us give you suggestions based on wide practical experience. We'll also send you a list of foundries that supply Ni-Hard. So write INCO today.

10 times longer life
than steel balls previously tried by Vulcan Mold & Iron Co., attests to stamina of Ni-Hard balls, produced by United Engineering & Foundry Co.

INCO TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

Is It Peace?

In the last several weeks tensions between the West and the East have been greatly eased. The Reds are smiling, posing for pictures and making conciliatory gestures.

The dove of peace seems to be flying high. But as realistic businessmen, we can see through the sham.

A nation that still has wartime austerity while the rest of the world prospers can afford to be conciliatory under the pressure of a seething populace. Russia needs the trade and know-how of the West.

West Berlin is a good example. That land-locked isle of free enterprise in the middle of the Red sea is a continuing source of consternation and irritation to Russia and her satellites.

Look down Schloss Strasse in the West Zone. You see a Saturday-night maze of streetcars, electric busses, autos, people crowding the sidewalk. The new shopping area has grown up since the partition of Berlin.

Then look down Leipziger Strasse in the East Zone. You see a couple of plodding streetcars, a few autos, no electric busses, perhaps a hundred people and most of the desolation of World War II. It once was the famous shopping street of Berlin.

If you want more evidence, look in the windows of stores on the West side of the Potsdamer Platz. They're loaded with unrationed items ranging from clothing to watches and tropical fruits. East Berliners can't afford to spend their devalued currency on these luxuries.

Then look for unrationed goods in the windows of the makeshift Communist HO stores in the burned-out buildings on the East side of the Platz. The windows are bare. Doors are closed. There's nothing to sell. Deeper into East Berlin, you can find people queueing up for what's available in the rationed-goods stores.

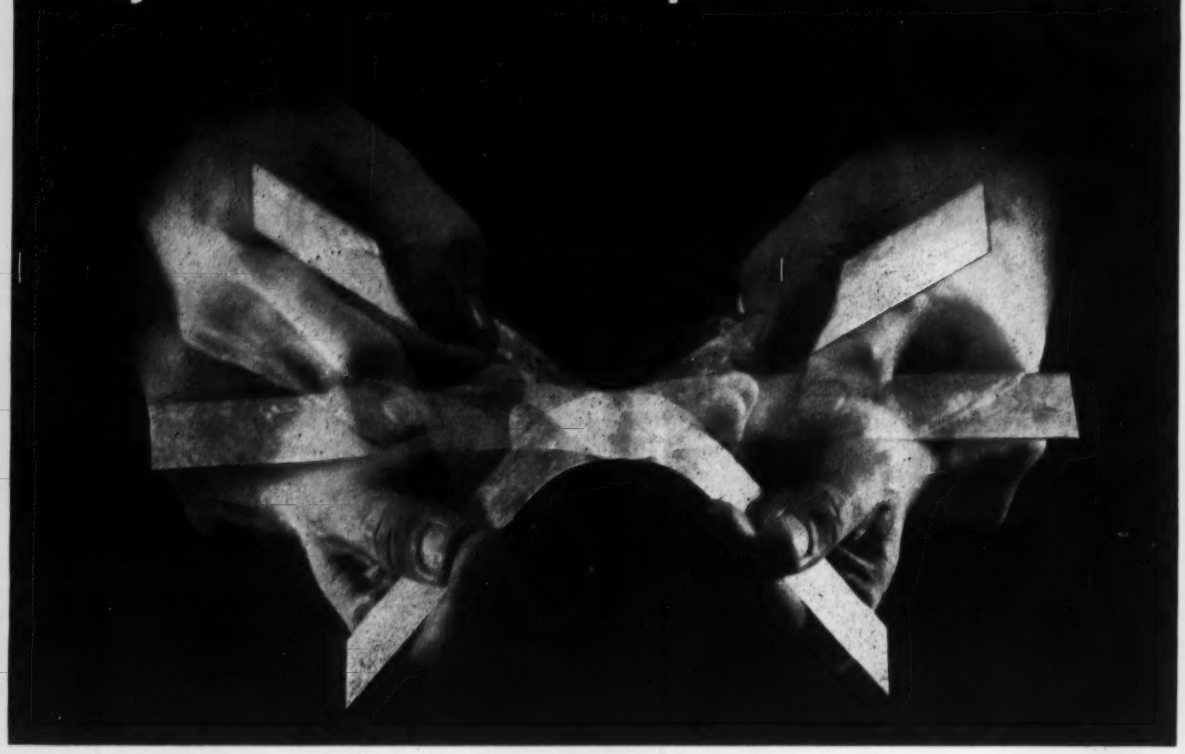
The prosperity that has filtered through the barbed wire of the Iron Curtain to West Berlin is ample evidence on Russia's doorstep that communism is not mankind's panacea.

Dealing with Russia requires infinite firmness and patience. Until she retreats from her goal of world-wide communism and makes concessions other than simply agreeing to negotiate, there can be no real peace.

Irwin H. Such

EDITOR

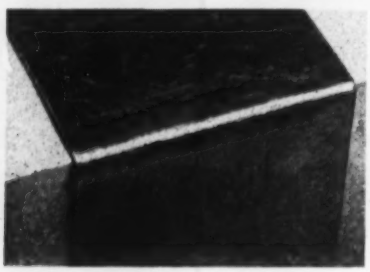
Can your Galvanized Sheets pass the "bend test"?



Just take a piece of the galvanized you're now using—bend it back and forth a few times. Do the same thing with a sample of Inland Ti-Co (which we'll gladly send you). Now look at the coating where the sheets were bent. We know the Ti-Co didn't flake—but did *your* galvanized? You can see for yourself why Ti-Co will improve your products, cut manufacturing costs and practically eliminate rejects.

Here are results of identical laboratory-controlled bend tests:

CONVENTIONAL "POT-DIP" GALVANIZED. *See where coating cracked and flaked off. Reason: brittle alloy layer which exists between zinc coat and steel.*



INLAND TI-CO. *No cracks or flaking after bending. Patented Ti-Co manufacturing process virtually eliminates brittle alloy layer, applies a tight zinc coat that withstands any forming that the base steel will take.*

Ordinary bending is probably the simplest forming your galvanized sheets will ever be called on to take. But the zinc coating on Inland Ti-Co will stand up under really tough punishment, too. You can lock-seam it, draw it, pound it, nail it . . . and Ti-Co's tough, tight, corrosion-resistant coating stays snug to the steel. Rust is sealed out!

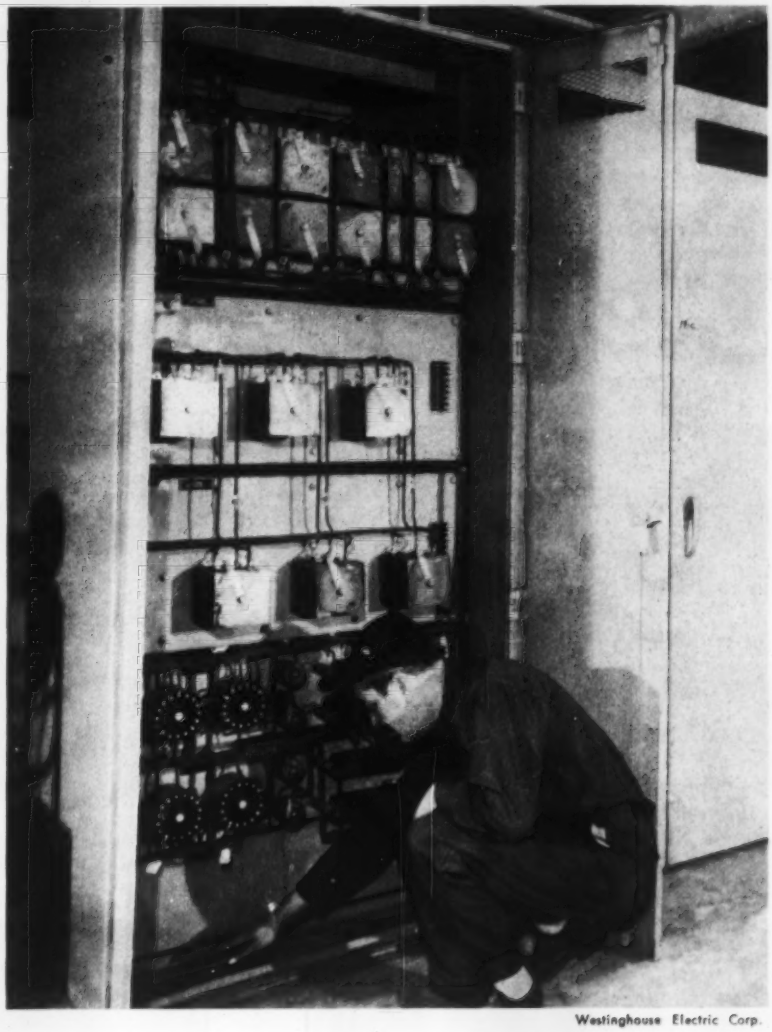
PROVE IT YOURSELF! For a free test sample of Ti-Co, write Dept. 258-A

INLAND Ti-Co

INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago, Milwaukee, St. Paul, St. Louis, Davenport, Kansas City, Indianapolis, Detroit and New York



Westinghouse Electric Corp.

Coming are more and better "brains" to run equipment as . . .

Automation Spurs Controls

TELL AN AUTOMATIC control equipment producer that his industry expects sales of $350 million this year, and you'll bore him. Ask him to tell you what he expects in the future, and try to stop him!

Although the $350-million estimate represents a gain of 10 per cent over last year, control equipment makers are looking far beyond this year's sales. As one producer explains: "If the gross national product continues to increase, and people demand a higher standard of living while working shorter hours, the individual worker must grow much more productive. The only answer to this problem is increasing automation and use of automatic controls."

Sales in 1955—Control equipment sales are increasing, even with a decline in new plant expenditure this year. That's because more mechanization is needed to help one man do the work of two or three. Some phases of metalworking are only beginning to use electrical controls. Others have reached the effective limits of electrical controls and are investing in electronic devices. Most controls, says Cutler-Hammer Inc., Milwaukee, use a combination of electronic and electric control components.

With metalworking and other industries rapidly growing into higher mechanization, present control applications merely demonstrate future possibilities in industry and the home. (For an example of how automation already has increased the need for controls in foundry equipment, see page 94).

Present Applications—"Continued high rate of home and commercial building will sustain demand for heating and air conditioning controls," points out Minneapolis-Honeywell Regulator Co., Minneapolis. That firm believes the swing to industrial automation will boost sales of factory control systems.

"Accurate regulation of flow, temperature and pressure is essential to nearly every manufacturing process," says John A. Robertshaw, president of Robertshaw-Fulton Controls Co., Greensburg, Pa. "In the home, cooking ranges (with controlled time and temperature), refrigerators, washing machines and other household appliances are no longer luxuries. Apart from their convenience and economy, it is fast becoming mandatory to use automatic controls to provide safety in the use of gas, oil and electricity," he adds.

Aids to Steelmaking—In the steel industry, Electric Controller & Mfg. Co., Cleveland, reports more controls are being used in the automatic positioning of rolls. Scrap handling is following suit.

Steel fabricators are demanding closer tolerances and better quality. That's why new rolling mills, like Pittsburgh Steel Co.'s Allenport, Pa., cold-strip mill, must have modern electrical controls to hold their competitive position. Westinghouse Electric Corp., Pittsburgh, furnished the electrical equipment which met the Allenport requirements.

What's Ahead—Present applications are only half the story. Mr. Robertshaw explains: "The coming age of automation and the use

of atomic energy for peaceful purposes promise even greater use of automatic controls." President F. W. Magin of Square D Co., Detroit, says: "Significantly, designs embodying the science of electronics appeared in 1954 more frequently on the assembly lines and in our laboratories."

This indicates several branches of industry have reached such a high level of mechanization that electrical controls are too complex for efficient operation. As this equipment grows more complicated in its control of many machines, there's more chance of failure. The manufacturer can't add to his controls without extra maintenance expense and costly down time. The answer lies in electronics.

Problem Solved—Westinghouse's new control system, Cypak, substitutes static switching circuits for bulky relay systems. Significantly, Cypak's first applications are in an automatic welder and machine tools—where present controls have reached their practical limits and where down time is expensive.

Future needs of the steel industry indicate a far greater reliance on electronic controls. Mills now have a large investment in electrical controls. Eventually, they must develop greater speed in finishing lines to meet greater demand without investment in new plants. That means: More mechanization to get maximum productivity per worker. To meet these needs, automatic control producers must grow with the steel industry. "All processing lines could use more controls, and they are doing so," adds Clark Controller Co., Cleveland.

Growth Through Research—Control producers are mapping this growth in their research. Watch for applications of electronic control systems in sintering plants, tandem rolling mills and blast furnace charging. "Mill operations cause considerable wear on equipment," point out Westinghouse researchers. "Cypak, with no moving parts or filaments, can't burn out."

Benefits of new controls will affect you at home as well as on the job. Minneapolis-Honeywell has an advanced automatic temperature control, which takes inside and outside weather into account, and a fire alarm which can be installed in new homes.

Expansion Demanded — With market potential soaring, many controls producers are bolstering production and research facilities. To meet mounting demand for its electronic controls used in automated processes, General Electric Co. moved its specialty control department from Schenectady, N. Y., to a new plant in Waynesboro, Va.,

J. F. Ray, vice president, sales, of General Controls Co., Los Angeles, in opening expanded facilities in Cleveland, said: "The use of automatic controls throughout the country will be two-thirds greater in five years than it is today and will double by 1970. This is one of the fastest growth rates of any industry in America."

Atom Grows

U.S. leads with 29 reactors, world's total is 42. Building are 20; planned are 22 more

THE ATOM is going commercial in the U. S. But a patent storm is brewing overseas, threatening the export trade of U. S. nuclear firms.

Philips Lamp of Endhoven, Holland, holds the basic reactor patent in England, France, Belgium, Spain, Germany, Austria and Holland. In the U. S., the patent is held by the Atomic Energy Commission which offers it royalty free to American industry. Foreign countries may find that they will have to pay Philips Lamp to use the know-how given them by the U. S. under the Atoms-For-Peace program.

Private Money—American atomic progress got a boost or two in the last ten days. Charles E. Oakes, president of Pennsylvania Power & Light Co., informed the Atomic Energy Commission that his company will build a privately financed atomic-electric plant of at least 150,000 kw. A homogeneous-type reactor will be used; the plant will be commercially competitive with generating stations using conventional fuels, says Mr. Oakes.

Westinghouse Electric Corp. will be codeveloper in the design and will supply the reactor and its related electric generating equipment. The new unit is planned to be in service in 1962.

More Progress — Eight companies are forming a joint corporation to build and operate an atomic reactor near New York for industrial and medical research. The unit, estimated to cost between $1.5 million to $2 million, will be designed and built by AMF Atomics Inc., a subsidiary of American Machine & Foundry Co.

Other participating companies are American Tobacco Co., Continental Can Co., Corning Glass Works, International Nickel Co., Chas. Pfizer & Co. Inc., U. S. Rubber Co. and Socony Mobil Oil Co. Inc. The reactor will be a "swimming pool" type—the uranium fuel is suspended in a pool of water.

Socony Mobil Oil also will build a nuclear research center. It will include a Van de Graaff accelerator and laboratories for manipulation of fission-waste radioisotopes and secondary radioactive sources, assaying radioactive materials and general research.

ODM Issues 41 Certificates

Fast tax write-offs issued in the two-week period ending July 27, totaled $309,206,680.

The three largest certificates of necessity were issued to utilities for power-generating and related equipment.

AF Awards Design Contracts

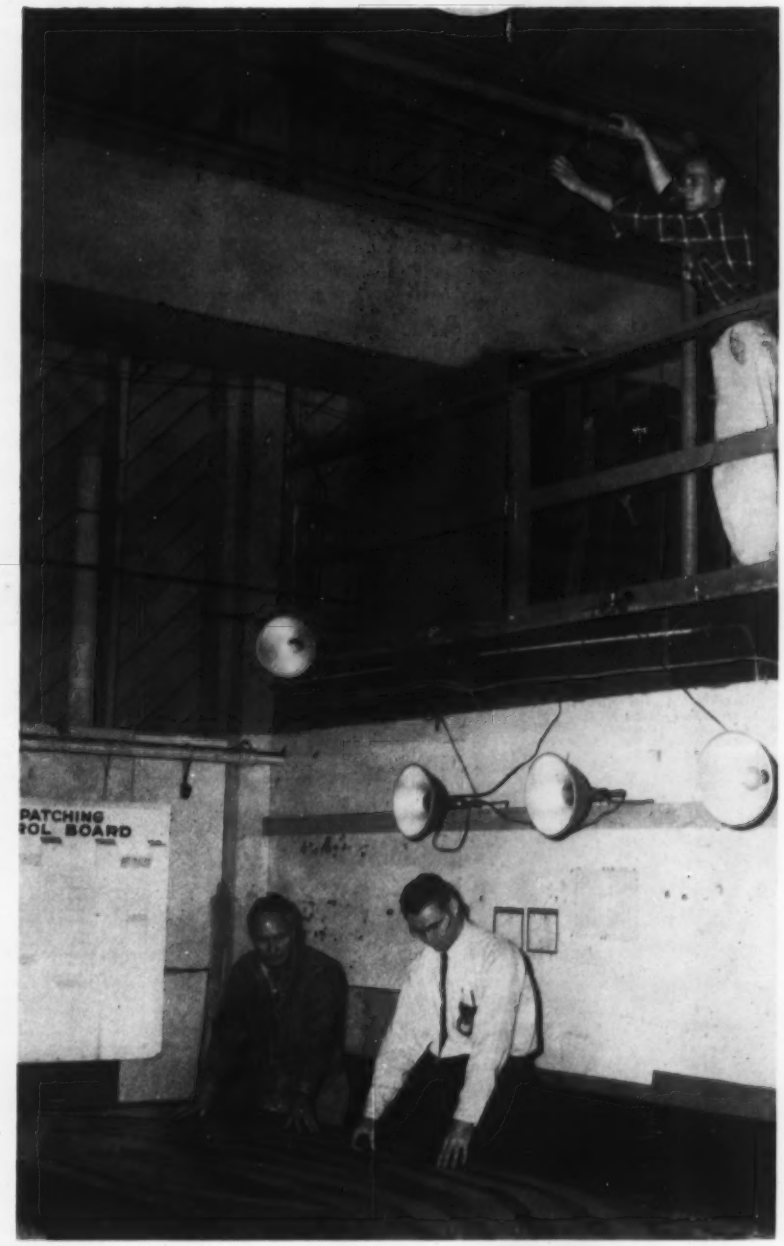
Six U.S. aircraft companies have contracts to work up paper studies on three new combat planes.

Contracts for a long-range interceptor went to Lockheed Aircraft Corp., Northrop Aircraft Inc. and North American Aviation Inc.

Republic Aviation Corp. and North American will work on a fighter-bomber.

Glenn L. Martin Co. and Douglas Aircraft Co. Inc. will study a tactical bomber.

The Air Force said it chose two or more companies to develop each plane to get the full benefit of the competitive nature of the aircraft industry. The Air Force will select one design of each type for production.



Ryan's raw stores department photographs paper templates arranged on a layout table. Prints are used as cutting patterns by router operators. Though material is saved, biggest gains are in shearing time. Router operators don't have to duplicate the work before cutting. A Polaroid camera is used for speed

Put Photography To Work

THE PICTURE above shows one of many ways photography solves industrial problems at Ryan Aeronautical Co. You probably can use some of the ideas in your plant.

Big Picture—Pictorial records of test instruments are made periodically during test flights with a Polaroid camera. Engineering uses a room-sized, 8½-ton Langston monotype camera to reproduce (on any scale) and transfer engineering drawings directly to the material from which experimental parts are to be made. Scale projections for making dies are given the oversize needed to compensate for cast metal shrinkage.

Photographic reports are made monthly on all development work. First articles on new orders are pictured from every angle for the benefit of the customer and Ryan's production staff. Photography is an important factor in the production of printed electric circuits for miniature subassemblies.

Personnel Touch — Ryan has about 100 applicants each day for its 605 job classifications. It saves a lot of talk and avoids many mistakes by using photographs to illustrate job descriptions.

William Rossi, employment interviewer, remarks: "A good percentage of the people who come to us have worked in different parts of the country where jobs, machines and skills have different names. If you're looking for an arc welder, you waste time testing a man if his experience is in gas welding. Since most misunderstandings are unintentional, I've found that pictures eliminate trouble from the start."

Mr. Rossi's indexed loose-leaf photo file points out, instantly and graphically, job requirements which used to take half an hour to describe.

Sales—Ryan's salesmen use 3-D color slides and viewers as sales aids.

The color movie department makes features for official showings to government groups, educational use, public relations and sales tools.

Safety—The movie department operates closely with plant safety departments. Two-man photo teams turn out 5-minute color dramas that faithfully reproduce circumstances of plant accidents, usually starring the victim in "As It Happened" and "How It Could Have Been Prevented" sequences. Ryan's safety record: Over 5 million man-hours without a disabling injury.

Ryan makes all the standard uses of pictures: Illustration for employee papers, sales brochures and reports; visual training aids; and records of damaged shipments.

6208 Plants Cast Metal in U. S., Canada

STABILITY of the foundry industry was good over the slack period in 1954.

The 1955-56 edition of *Penton's Foundry List*, just published by the Penton Publishing Co., Cleveland, shows that 6208 plants are producing castings in the United States and Canada.

Since 1953, 575 foundries went out of business. They were replaced by 479 new ones. *Foundry*, also published by Penton, says the slight loss is more than offset by mechanization, modernization and expansion of existing plants, plus new high production foundries.

Trends — Diecasting plants are included for the first time in *Penton's Foundry List* because of their growing importance. There are 680 diecasters—492 of them make diecastings exclusively.

With diecasting plants included, nonferrous foundries showed a sizable gain. Now there are 4212 foundries making nonferrous castings, compared with 3604 in 1953. Brass and bronze foundries rose from 2660 to 2723; those making aluminum castings from 2915 to 3355. Magnesium foundries total 261, up from 189. Zinc castings are produced by 796 foundries. (Many foundries cast more than one metal.)

Losses were shown in two of the three ferrous categories. Gray iron foundries fell from 2954 to 2729. Malleable foundries slipped from their 1953 total of 137 to 130. The trend toward larger but fewer plants continues. The number of steel foundries increased from 440 to 452 (probably due to a greater number of plants casting steel in investment molds.)

Precision Increases — All precision casting processes—shell, permanent, centrifugal, plaster and investment molding showed increas-

Where the Foundries Are in North America

	Total Foundries		Gray Iron Foundries		Steel Foundries		Malleable Foundries		Total Nonferrous		Exclusive Nonferrous Foundries		Brass & Bronze Foundries		Aluminum Foundries		Magnesium Foundries	
	1955	1953	1955	1953	1955	1953	1955	1953	1955	1953	1955	1953	1955	1953	1955	1953	1955	1953
Alabama	100	105	82	88	10	9	2	3	45	32	14	8	24	16	39	28	1	..
Arizona	7	7	4	3	1	3	..	..	4	5	3	2	3	3	4	3	..	..
Arkansas	24	18	11	12	1	1	..	..	17	11	12	5	7	5	16	10	2	..
California	532	481	126	139	41	35	3	4	422	361	370	304	228	217	352	304	45	33
Colorado	53	44	20	20	4	5	..	..	40	27	31	21	24	17	37	25	1	..
Connecticut	160	145	46	55	6	6	6	6	125	103	106	81	81	82	100	82	9	5
Delaware	8	9	2	3	3	3	1	1	4	5	3	3	4	5	2	3	..	..
Dist. of Col.	3	2	2	2	1	2	1	1	3	2	1	..	3	2	3	2	1	1
Florida	53	45	19	20	1	1	..	..	49	38	33	23	32	27	45	35	2	3
Georgia	66	69	45	50	4	3	..	..	35	35	17	16	28	24	32	31	1	..
Idaho	8	7	7	6	1	1	..	..	6	5	..	..	4	5	6	4	..	..
Illinois	485	436	160	177	32	35	19	18	336	252	290	208	166	159	260	203	18	12
Indiana	246	231	111	117	9	9	8	8	153	116	122	93	84	84	116	96	9	6
Iowa	85	88	55	57	2	3	1	1	49	43	28	26	26	26	44	36	2	1
Kansas	54	54	26	29	2	1	..	..	34	27	28	22	16	17	29	24	5	5
Kentucky	27	33	19	22	1	1	..	..	14	20	7	8	12	16	9	13	1	1
Louisiana	31	34	17	19	6	5	..	1	19	19	10	10	15	14	15	14	1	..
Maine	24	22	19	17	..	..	..	..	19	14	6	5	17	14	17	10	..	1
Maryland	48	43	21	20	2	2	2	2	35	28	25	20	26	24	31	23	3	2
Massachusetts	233	222	91	97	13	13	3	4	167	144	132	109	135	125	135	117	11	8
Michigan	436	386	156	170	29	31	8	9	293	218	258	180	149	152	193	152	36	16
Minnesota	95	95	50	54	7	5	1	1	54	44	38	31	38	34	47	39	3	3
Mississippi	13	11	10	11	..	..	..	..	9	6	3	..	7	5	5	5	..	..
Missouri	138	127	46	44	11	11	1	1	92	82	84	73	58	53	80	70	3	4
Montana	5	7	5	5	..	..	..	..	4	4	..	1	4	3	2	3	..	..
Nebraska	26	26	13	14	1	1	..	..	22	21	12	10	14	15	19	19	1	1
Nevada	2	2	2	2	1	..	..	..	2	2	..	..	2	2	2	1	..	..
New Hampshire	23	26	12	16	2	3	1	1	2	17	..	8	16	17	18	13	2	1
New Jersey	233	223	73	86	16	15	2	2	179	159	147	123	113	126	127	122	11	9
New Mexico	4	5	1	2	..	..	..	..	4	3	3	2	4	2	3	3	..	..
New York	413	408	146	162	29	27	10	11	311	288	238	211	215	227	241	240	19	17
North Carolina	65	67	54	56	..	..	..	..	48	42	12	10	38	38	43	39	2	..
North Dakota	3	3	3	3	..	..	..	..	3	2	..	..	1	2	3	2	..	..
Ohio	585	569	223	237	38	35	17	20	383	331	315	274	233	213	299	256	26	18
Oklahoma	46	41	23	22	1	2	..	..	29	27	21	18	18	20	22	23	..	2
Oregon	65	62	33	34	9	8	..	..	39	31	25	20	31	27	31	24	3	2
Pennsylvania	526	513	266	290	64	67	13	12	312	269	210	168	235	222	244	192	7	8
Rhode Island	43	39	14	13	..	..	1	1	29	27	28	25	20	23	20	21	..	..
South Carolina	22	25	17	20	1	1	..	..	18	19	5	4	17	17	16	18	2	2
South Dakota	3	3	3	3	..	..	..	..	2	1	..	..	1	1	2	1	..	..
Tennessee	75	75	58	62	3	4	..	..	46	36	17	12	33	27	36	32	3	1
Texas	153	143	69	75	13	11	1	1	105	86	76	59	78	70	90	71	4	6
Utah	18	19	15	16	1	2	..	..	8	8	3	3	6	8	5	7	..	1
Vermont	16	19	14	15	..	..	..	..	7	8	2	4	5	8	6	6	..	..
Virginia	54	58	48	50	5	5	1	..	35	31	6	5	31	29	28	22	1	..
Washington	75	74	37	38	17	18	1	1	54	51	31	27	43	43	47	42	2	2
West Virginia	33	39	16	20	2	3	1	1	19	21	14	15	18	20	13	15	2	1
Wisconsin	233	226	111	118	21	17	11	11	138	116	100	83	95	90	112	101	6	4
Wyoming	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	5,650	5,387	2,402	2,591	411	404	115	121	3,839	3,240	2,895	2,330	2,458	2,376	3,046	2,602	245	176
Canada	558	551	327	363	41	36	15	16	373	364	204	168	265	284	309	313	16	13
U.S. & Canada	6,208	5,938	2,729	2,954	452	440	130	137	4,212	3,604	3,099	2,498	2,723	2,660	2,355	2,915	261	189

es. Most remarkable is the jump in shell molding, up from 197 to 422.

Other increases: 104 in permanent molding, 31 in plaster molding and 30 in investment casting.

Leading States—Ohio continues as the leading foundry state with 585 plants. California is second with 532. Pennsylvania is third with 526, Illinois is fourth with 485 and Michigan is fifth with 436. Wyoming is the only state without a foundry. Canada has 558.

Steel Payrolls Set Record

The June payroll of the iron and steel industry was higher than any previous month's; and the one for the first half of this year will set a record, too, reports the American Iron & Steel Institute.

Wage and salaried employees drew an estimated $298.4 million, over $4 million higher than the record set in May. The payroll for the first six months was $1.7 billion, more than $235 million over the same period in 1954.

Total employment in June was estimated at 667,100 wage and salaried employees. This was the fifth substantial monthly increase.

Handling Clinics Start Travels

The first fall presentations of the Material Handling Institute's traveling clinic will be in Cleveland and Louisville on Oct. 18 and Oct. 19.

Each panel includes five management men (of member companies); they tackle materials handling problems in open forums.

U. S. Gets Titanium Offer

Columbia - Southern Chemical Corp., Pittsburgh, and Imperial Chemical Industries Ltd., London, England, have applied to the government for a contract to sell 5000 short tons of granular titanium a year for five years.

In their application, they say they will introduce into the U. S. a granular titanium process not used here and offer to make new techniques available to fabricators.

If they get the contract, the two companies will form a jointly owned subsidiary to produce titanium by Imperial Chemical's sodium reduction process. Each parent company would hold a 50 per cent interest in the new company, Columbia Titanium Co. The plant would be built at Natrium, W. Va., at a cost of about $10 million.

Zinc Foundries 1955	Permanent Mold Producers 1955	Permanent Mold Producers 1953	Centrifugal Casting Producers 1955	Centrifugal Casting Producers 1953	Plaster Mold Producers 1955	Investment Mold Producers 1955	Die Casting 1955	Shell Mold Producers 1955	Pattern Shops 1955	Jobbing Foundries 1955	Captive Foundries 1955	Jobbing & Captive Foundries 1955	
2	7	7	7	7	2	1	1	4	75	43	10	47	Alabama
2	4	2	..	1	..	..	..	2	6	2	..	5	Arizona
5	8	4	..	..	1	..	5	2	13	10	2	12	Arkansas
93	102	102	32	33	15	18	80	32	252	309	70	153	California
7	16	12	..	..	2	..	9	2	26	23	8	22	Colorado
33	23	16	4	2	4	2	23	10	75	92	23	45	Connecticut
..	..	..	..	..	..	..	..	..	5	2	1	5	Delaware
2	1	1	1	1	1	1	..	1	2	1	2	..	Dist. of Col.
19	11	11	4	2	3	..	7	1	34	22	5	26	Florida
3	10	6	1	..	4	..	4	5	47	19	12	35	Georgia
1	3	1	..	..	..	..	..	1	6	3	..	5	Idaho
92	55	43	10	10	15	10	92	40	266	258	76	151	Illinois
16	31	21	6	6	7	3	29	21	143	121	47	78	Indiana
11	9	10	..	..	2	2	10	..	57	31	17	37	Iowa
5	6	5	1	..	6	1	4	..	36	22	8	24	Kansas
4	1	1	..	1	..	1	1	..	19	10	4	13	Kentucky
3	4	3	..	..	..	..	1	..	22	12	6	13	Louisiana
3	1	1	..	..	1	..	..	..	16	9	3	12	Maine
8	8	3	1	2	3	..	4	1	26	19	10	19	Maryland
27	16	16	8	9	11	9	16	18	138	136	37	60	Massachusetts
89	46	50	16	20	15	10	81	44	209	252	53	131	Michigan
12	13	9	2	1	2	4	10	4	52	49	10	36	Minnesota
1	2	2	..	..	..	..	..	..	9	4	3	6	Mississippi
17	20	21	3	3	5	3	17	14	71	69	15	54	Missouri
1	1	2	..	..	..	..	..	..	4	1	1	3	Montana
5	6	5	..	..	2	..	3	1	21	6	9	11	Nebraska
..	1	1	..	..	..	..	1	1	2	1	1	..	Nevada
1	1	1	..	..	..	2	1	1	16	7	..	16	New Hampshire
42	29	28	12	10	9	8	35	23	119	145	35	53	New Jersey
..	2	..	..	..	..	..	1	..	3	2	..	2	New Mexico
61	46	43	15	21	12	27	51	40	223	201	65	147	New York
3	3	2	1	..	3	..	3	..	42	24	14	27	North Carolina
..	..	..	..	..	..	..	..	..	3	1	..	2	North Dakota
57	67	62	27	21	29	11	56	33	343	325	90	170	Ohio
6	1	4	3	2	1	..	3	3	29	22	6	18	Oklahoma
7	4	3	3	3	..	1	6	7	30	32	4	29	Oregon
37	40	30	18	22	9	6	35	35	355	246	77	203	Pennsylvania
7	4	2	3	1	4	1	4	4	18	27	2	14	Rhode Island
2	..	..	..	..	..	1	2	1	18	11	2	9	South Carolina
..	1	..	..	..	..	..	..	..	3	1	1	1	South Dakota
4	7	5	1	1	4	1	4	2	59	22	12	41	Tennessee
16	22	16	6	5	1	2	13	10	86	76	9	68	Texas
..	2	3	1	2	..	..	1	2	10	10	3	5	Utah
..	..	1	..	..	..	..	..	1	13	4	3	9	Vermont
6	8	6	2	4	3	2	3	3	38	22	7	25	Virginia
11	6	3	3	2	1	1	3	5	47	40	6	29	Washington
..	4	3	4	3	1	1	..	2	23	15	1	17	West Virginia
20	28	31	13	9	3	3	20	20	131	122	28	83	Wisconsin
..	..	..	..	..	..	..	..	..	..	..	..	..	Wyoming
741	680	598	208	205	181	132	639	396	3,242	2,881	798	1,971	Total
55	81	59	27	16	11	11	41	26	376	204	64	290	Canada
796	761	657	235	221	192	143	680	422	3,618	3,085	862	2,261	U. S. & Canada

Gunpowder-driven fasteners may be the answer as . . .

Explosives Makers Shoot for New Markets

RAMSET Fasteners Inc., Cleveland, pioneered a powder-actuated tool for setting fasteners in steel and concrete in 1947. Between 1949 and 1954, the company's sales blew off the chart, up 1000 per cent. Today, it makes the biggest sales noise in that phase of the powder business (total annual volume, $7 million).

The powder-actuated tools industry is being watched with an interest out of proportion to its annual take of gunpowder. Reason: Industrial explosives makers like Hercules Powder Co., Olin-Mathieson Chemical Corp. and E. I. du Pont de Nemours & Co. have diversification problems.

Big 2 Per Cent—Though such tools account for less than 2 per cent of total explosives sales, they are building the first new market with any promise of volume to come along in years. Explosives makers have doubled their sales volume between 1949 and 1954, while the gross national product has tripled.

Mining and construction together make up about 98 per cent of the total market for industrial explosives. Though different branches of these industries vary their demands from year to year (coal mining dropped from 32 to 26 per cent of the total from 1953 to 1954), the over-all market, says G. H. Loving, director of sales for du Pont, "is tied directly to the economy at a more or less fixed figure."

Development — Explosives makers have been concentrating their efforts on giving the customer more bang for his dollar, making explosives safer to handle and getting better control of the effects. These goals have been achieved so well that the New York Thruway was blasted through solid rock while an instrument laboratory almost on top of the project worked undisturbed.

Established markets assure makers of a comfortable future. Says C. W. Ballard, director of sales for Hercules Powder: "Immediate prospects in the industry are favorable. Long term, it is expected that consumption will increase with the additional demand for coal, iron, oil, improved highways, water power and development projects." Sales this year will come within 2 or 3 percentage points of 1953, a record at 758 million lb.

Fresh Fields—But a lot of hard work is going on among makers to take explosives out of the basic fields and put them to work in the plant. Research is being done on gunpowder as a new tool for accurate and inexpensive laboratory testing. Other uses:

Kennametal Inc., Latrobe, Pa., compacts its titanium carbide by setting off an explosion inside a plugged cannon containing raw materials and water. Moore Co., Marceline, Mo., forms Monel hubs for industrial fans by blasting the metal to die contour with dynamite. Oliver Iron Ore Mining Co., Minn., uses a powder-actuated gun to clean clinker accumulations

from its taconite refining kilns.

Touchstone—Explosives makers are on the lookout for other new uses. One of them could be the key to a volume market. To many observers, powder-actuated tools look like the best bet at the moment. Olin-Mathieson thinks so. It bought Ramset in 1952.

More of the Same

Congress approves a further $100 million in machine tools for fiscal 1956

THE ARMED FORCES will be spending another $100 million on reserve machine tools and facilities in fiscal 1956.

Congress has instructed them to report on their needs to the assistant secretary of defense for supply and logistics by Aug. 15. Reports will list mobilization base projects requiring machine tool equipment reserves.

Echoes—The first appropriation for this purpose, $100 million for fiscal 1955, hasn't been depleted. Its distribution: $84 million to the Air Force, $14.5 million to the Navy and $1.5 million to the Army. Though it's not know how the new appropriation will be passed out, the Air Force is sure to get a substantial share again.

The so-called "elephant tool" program, after being stalled for the last year, is getting up steam again at the Office of Defense Mobilization. Components for the tools are getting the most interest.

Small Firm Defense Orders Up

Military departments gave $315 million worth of contract awards to small business firms in May. This is the highest monthly total in the fiscal year beginning July 1, 1954.

May awards to small business were 39.1 per cent of total defense awards for the month and well above the 25.5 per cent average for the first five months of this year.

The share for small business in May is not typical, but Thomas P. Pike, assistant secretary of defense, says there is a continued upward trend.

Building, maintaining New York spectaculars is business of . . .

Lamplighter of Broadway

OFF TIMES SQUARE in New York City is Artkraft Strauss Sign Corp.

Its primary business: Keeping the area aglow at night with multicolored lights and animated effects on neon signs.

Signs of Times—Operating from a plant at 57th street and 12th avenue, this company has designed, fabricated, constructed and maintains possibly 90 per cent of the district's spectaculars. And it's no "light" business. Company engineers estimate these signs have used 1500 tons of steel—I-beams, H-beams, wide-flange sections, angles, galvanized sheet steel, enameling stock and stainless steel. Bronze, copper and aluminum go into them, too.

The largest Artkraft Strauss sign is for Budweiser. It took 100 tons of steel, for sign and structure, plus six weeks of work in the shop and four weeks on the job to put it together. The Johnnie Walker sign, a recent addition in the Times Square area, consumed 40 tons of steel.

Other Business—While the company's major operation is devoted to neon sign spectaculars, it also fabricates signs for theater marquees and overhead directional highway signs. At the moment it is fabricating a bell tower of aluminum for a new chapel at the Massachusetts Institute of Technology.

Among the 190 or so employees of Artkraft Strauss, 70 to 80 are metalworkers and erectors. Others are glass blowers, design engineers, portrait and landscape artists and "sign watchers," who patrol Times Square looking for sign trouble.

Jacob Starr, dubbed the "lamplighter of Broadway," heads the company. Years ago he was an immigrant candlemaker.

By E. C. KREUTZBERG Washington Editor

Ideas for Industry

LOOKING for profitable new products, or for new or improved ways to beef up your production line?

Check the file of patents maintained by the Government Patents Board, Benjamin B. Dowell, chairman, 7420 Commerce Bldg., Washington, D.C.

Patents—The board publishes abstracts of its some 5000 patents. Inventions are available to all manufacturers on a nonexclusive, royalty free licensing basis. The Government Printing Office handles the publications.

The board also has a file of about 16,000 privately owned patents under which the government has a license. They can be used royalty free by contractors supplying the government.

Profits—Civilian manufacturers can make use of these inventions by obtaining a license from the patentholder. One midwestern company tells STEEL it recently got a line on more than 25 new products by looking over the list.

Mr. Dowell can be reached by phone at Sterling 3-9200, Ext. 4331.

OSI Gets Set

Although there's no recent news from the Commerce department about its Office of Strategic Information, a lot of work is going on behind the scenes.

The development of uniform understanding among departments and agencies of the government on what unclassified information should be realeased is the main objective. This would eliminate snafus of the earlier days of the news blackout. One agency closed the lid on a piece of news, while another gave it out gladly.

No Letup—The Commerce department feels that the major goal of the agency (to prevent the spreading of unclassified technical or industrial information that might be prejudicial to the defense interests of the country) has lost none of its urgency despite garden parties and smiles from the Kremlin.

The OSI is attempting to come up with a more effective approach to editors, many of whom saw the program as an invasion of the rights of the press. It is giving thought to the development of ways and means of promoting the exchange of some data between America and Iron Curtain countries, like releasing speeches made by Russian technologists for publication here.

The Men—Erwin Seago, who left his Chicago law practice in June to serve as a special consultant to Secretary Sinclair Weeks, has been appointed acting director of the OSI. He succeeds R. Karl Honaman, now deputy assistant secretary for Public Affairs, Department of Defense. Mr Honaman, on leave from Bell Telephone Laboratories, New York, is charged by DOD with "studying the complex problems relating to published information which on balance can be inimical to the defense interests of the United States."

Problems Pending

Major legislation not completed in the first session of the 84th Congress and held over for the second session deals with: Highway aid, aid for school construction, health reinsurance, customs simplification, statehood for Alaska and Hawaii, expansion of the Social Security program, natural gas regulation, farm price supports and increased postal rates.

Pentagon Cuts Duplicates

As the Defense department passes the two-thirds mark in writing a new joint-services supply catalog, it reports that 97,000 duplicate supply items have been pruned.

About 67 per cent (1.6 million) of an estimated 2,375,000 items have been identified. Some savings so far: 1,428,000 cubic feet of space saved; 127 specifications consolidated into 53; 109,170 manhours conserved; and $7,119,000 saved by the three military services.

Typical of the ways industry will benefit: 200 methods of attaching forging dies to presses have been reduced to one.

Adoption of this new standard makes possible the stocking of dies of military importance for loan to any forging shop; allows contractors to place orders for forgings in their locality; and provides a more competitive and equitable basis for bidding.

Pentagon representatives will continue their policy of interviewing top management of defense-contract companies to discuss the new supply program and its requirements.

Chrysler saves 10 operations

with flamatic hardening —Imagine the drop in unit costs when you save ten operations on one part, including plating, straddle facing and turning, re-broaching, carburizing, tempering, two washings, and three inspections.

All these operations were found unnecessary as a result of one decision at Chrysler Corporation's Highland Park plant: to switch to Cincinnati Flamatic for hardening the OD of this torque converter overrunning clutch hub.

A review of your own operations may reveal an opportunity for similar savings with Cincinnati Flamatic selective hardening. If you'd like to learn about other types of operations, from job lot to line production, write for Publication No. M-1861.

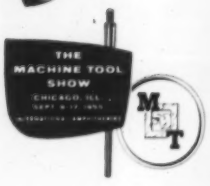
CINCINNATI **flamatic**

PROCESS MACHINERY DIVISION
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U.S.A.

see how GREENLEE DOES IT!

VISIT BOOTH No. 1221 AT THE 1955 MACHINE TOOL SHOW

See this production problem solved on a Special Greenlee Bar Automatic. It will be in normal production operation here at the show.



GREENLEE CAN HELP SOLVE YOUR PRODUCTION PROBLEMS

The creative know-how that built this special auger-bit machine is available to you. Make full use of Greenlee specialized engineering skills and ingenuity. Take advantage of its cost saving possibilities.

GREENLEE

GREENLEE BROS. & CO.
1928 MASON AVE.
Rockford,
Illinois

write for further information

Autos: Battle of Britain

British producers are revolutionizing their facilities, sharpening up their styling to compete for export markets with Germany, France, Italy

THERE'S A NEW battle of Britain, but it's on the ground, not in the air. British automakers are fighting it out among themselves and with producers in other countries for export markets.

Britain, hungry for hard currencies like U. S. dollars and anxious to improve its foreign trade balances, encourages the auto industry to ship cars abroad at the expense of its own foot-weary citizens.

High Output—In the first six months of this year, Britain produced 626,000 cars, busses and trucks of which 460,000 were the passenger variety. This was an all-time peak, 120,000 units above 1954 (and it was achieved in spite of the rail and dock strikes).

The government-owned railroad system managed to keep many of its goods wagons rolling, and those available were pressed into service to get materials to industry and handle outgoing shipments.

Expedients — Export shipments of autos were rescheduled to take advantage of every inch of shipping space in vessels not hamstrung by the dock strike—it lasted from the end of May into July. Thousands of motor vehicles had to be diverted to the home market. Even so, 44 per cent (278,000 cars, busses and trucks) was shipped out.

German Competition—Automakers are elated over their success with export sales, but they see trouble ahead, especially from the Germans, who have moved up fast and aggressively. They have come out with new single-unit construction that undoubtedly caused some British companies to switch from separate bodies and frames.

The French, too, refuse to be written off as contenders in the world market, although they are far outdistanced by Germany. Ford has sold out to Simca. Citroen has taken over Panhard; Hotchkiss and Delahaye have merged. Several new models are out, including a four-door sedan by Peugeot that sells for about $2000 retail.

Italy, Too — Italy's Fiat has plenty of manufacturing know-how and has invaded the low-priced field with a flea-powered but attractive model that sells for less than $1000. The U. S., is third in exports, with its higher-priced cars skimming off the top of the class market.

Here's how the Society of Motor Manufacturers & Traders Ltd. ranked the five leading export nations (on passenger vehicles only) in the first half of 1955:

	Units
Great Britain	200,000
Germany	160,000
U.S.A.	131,000
France	67,000
Italy	34,000

The fight for sales has reached such a crescendo, especially in the Western European motor markets, that British manufacturers are only too well aware that the cost of production remains a vital problem if they are to maintain sales.

Expansion—Currently, they are engrossed with the pros and cons of automation and substantial increases in capacity. Of the $344.4 million being spent by the five leading producers, Ford and General Motors' Vauxhall account for 80 per cent. It breaks down this way:

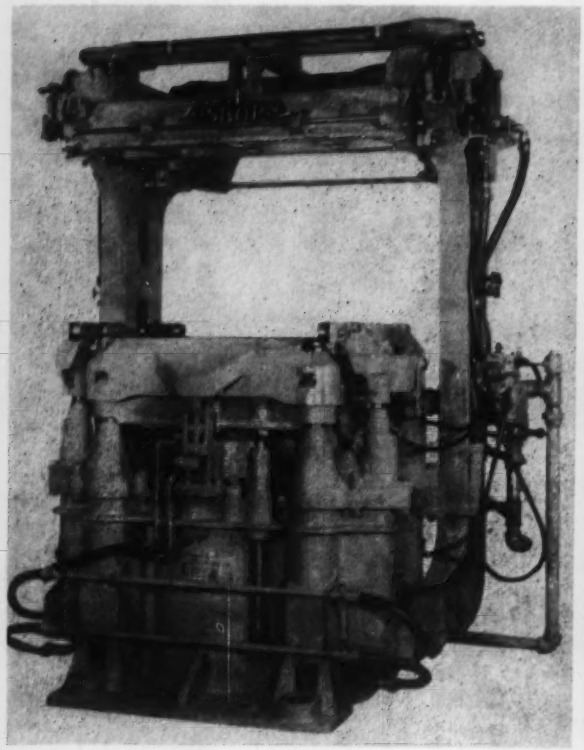
	Million
Ford	$182.0
Vauxhall	100.8
British Motor	25.2
Rootes	28.0
Rover	8.4

Ford's plant will include new foundry facilities, and a large order for equipment has just been placed with Osborn Mfg. Co. Austin division of British Motor Corp. has gone all-out for automation.

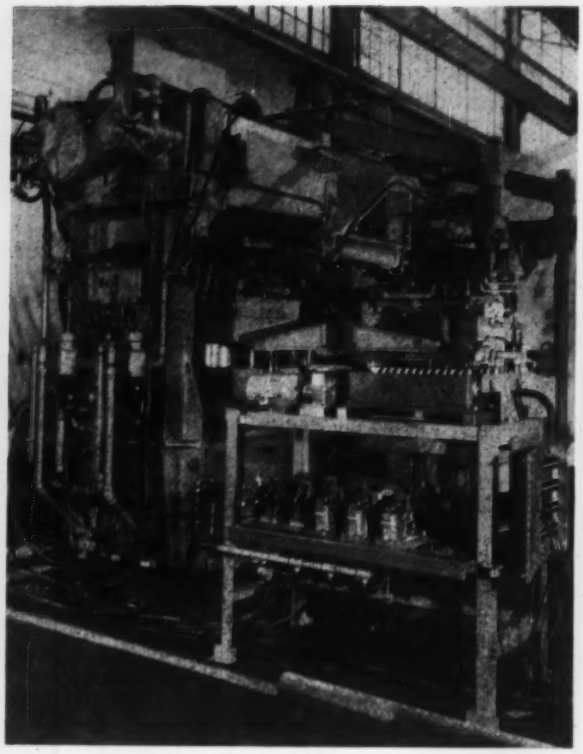
Springboard — British makers feel there's more to the big-spending program of the American affiliates than cost cutting. They think the Americans are using British plants as a springboard for greater control of the world market.

Styling and design also are in the picture. It's no longer a matter of utility and economy and long runs on a single body style. There's more talk about curved "windscreens" and the other gimmicks that have contributed so much to sales of American cars.

Sunbeam-Talbott assembly lines at the Rootes Group factory at Ryton-On-Dunsmore, Coventry, England. Rootes will spend $28 million on expansion



Before automation:
High production molding machines have simple air controls



After automation:
Test floor view shows complexity of automated molding units

Automation Also Changes the Builder

CHANGES brought about by automation are not confined to plants of users. Equally important are those it has made in the plants that build the equipment.

Before 1952, Osborn Mfg. Co., Cleveland, builder of mold and core making machines, made no automated equipment. (A move in that direction was the addition of automatic controls to standard models in 1951.) During the last three years, automated systems have accounted for 50 per cent of the company's sales. Shop employment of the machine division is about 100 men.

Changes — Engineering, production, purchasing and sales all feel the effects of converting from the manufacture of standardized machines to automated systems.

Osborn has two electrical engineers to design electronic controls and two electricians on the assembly floor. Before automation, these men were not needed.

Automation designs call for more engineering. Osborn has enlarged its engineering capacity by one-third; five men have been added to its engineering staff. The experimental department has grown from two to five men.

Before automation, Osborn made only mold and core machines. For its automated systems it makes mold closing machines, turnover machines and equipment to move flasks and molds. Another additional task: It must engineer the entire system.

Buy More — While automatic molding machines usually are standardized, the structural shapes and weldments that make up the mold handling devices are different for almost every job. This has meant a fivefold jump in the amount of weldments purchased.

All electrical controls are purchased. Before, none was. Standard molding machines do not use them. On automated machines solenoid valves replace the hand-operated ones used on standards. All solenoid valves are purchased; hand-operated valves are made by Osborn.

The amount of finished material purchased by Osborn has tripled since it went into automation. Purchased parts account for about 20 to 25 per cent of manufactured costs.

Sales—Once a field representative sold a machine and spent a day or two getting it in operation. Selling automated molding systems is another matter.

A proposal engineer is needed to draw layouts showing the relation of the parts of the system and establish the number of men needed to run it. Two service engineers aid the sales staff. After installation, a service engineer trains the customer in the use of the system—it takes from a few weeks to two months.

Automated equipment requires

twice the lead time of standard equipment. This means working capital demands are higher because shipments are more irregular.

Osborn regards automation as a challenge. Leon F. Miller, vice president, says: "Automation is here; the question is who is going to do the best job the fastest."

New Record Coming

Makers of air and hydraulic cylinders look for 1955 to beat previous sales performances

DEMAND for air and hydraulic cylinders appears headed for an all-time high this year.

Business reflects a high rate of general industrial activity and a growing number of applications for saving time and money in handling basic movements. The increase in use started to show in sales last year. Despite the lag in most industrial lines, volume dead-heated with 1953's, the previous record.

Markets—Air and hydraulic cylinders are used in all branches of industry—including machine tools, automobiles, agricultural equipment, aircraft, construction machinery, castings, chemicals, lumber machinery, plastics, power and utilities.

The atomic energy market, potentially a big one, already is growing rapidly, according to one maker. He also sees great opportunities in ordnance, including tank turret drives, guns and servomechanisms. Production machinery and machine tools form the biggest single market.

Makers—Trade estimates place the number of cylinder makers between 110 and 120, not including captive shops like those operated by a machine tool builder, an automobile manufacturer or a maker of agricultural equipment.

The number of independent manufacturers has increased little, if at all, since World War II. Some have dropped out and new ones have come in, but the total has been quite consistent. As long as facilities appear ample to meet demand, as now, it is unlikely that the number will increase much.

More selection, better food, less trouble mean . . .

Vending Machines Click

COINS are clicking through vending machine slots at a $1.8-billion rate this year.

That's about 12 per cent better than they did last year and about $300 million over the take in 1953. Gains indicate mounting customer acceptance of mechanical clerks.

Coming Soon—For vending machine makers, it meant sales of about $70 million in the last 12 months. Standards Factors Corp., a New York firm handling financing paper for vending equipment, predicts the industry will be selling $200 million worth of equipment annually in ten years; that vending machine sales will hit $5 billion.

The National Automatic Merchandising Association, Chicago, reports that the top three sellers are cigarets, soft drinks and candy. On the way up fast are coffee, milk and refrigerated sandwiches.

Feature Attractions—Contributing to sales are developments that cater to the whims of the customer. One unit will dispense your coffee any way you like: Black with cream and sugar, just cream, just sugar. Before you get it, the machine has measured the water, heated it and poured in the right amount of instant coffee. If you have change problems, the machine takes care of that, too.

Versatility of equipment is boosting "full line" installations—a battery of machines can be used to vend products like sandwiches, soups, beverages, pastries, candy and cigarets.

Profit Picture—If you employ 1500 or more and have cafeteria problems, it might pay you to check into such installations—generally operated by an outside agent. Two immediate advantages: Cafeteria losses stop; service is 'round-the-clock. Also, management headaches are eliminated.

There are about 125 vending equipment makers that use hefty amounts of cold-rolled sheet and strip, springs, castings, gears, electrical components, motors, heating and refrigeration units.

Nuts and Bolts—You can get an idea from this breakdown of a coffee machine produced at Bert Mills Corp., Chicago: Sheet steel, 225 lb; stainless steel, 25 lb; five small electric motors; and up to $50 worth of electrical components, including wiring, relays, heating elements and solenoids.

Vendfilm Inc.

How Great Lakes Steel *looks* at quality

SAMPLE "PINS" from heats are sent to a special Quality Control Laboratory where analyses of previous tests by wet chemistry are double checked by spectrograph.

SPECTROGRAPH is used to make doubly certain the finished steel meets the customer's specifications. Here a densitometer reading is made of a spectrogram to determine the percentage of elements present in the steel.

Quality is something you can *see* in our modern laboratories. In the photograph above a spectrogram is readied for reading in the densitometer—and one more test is underway to help assure quality.

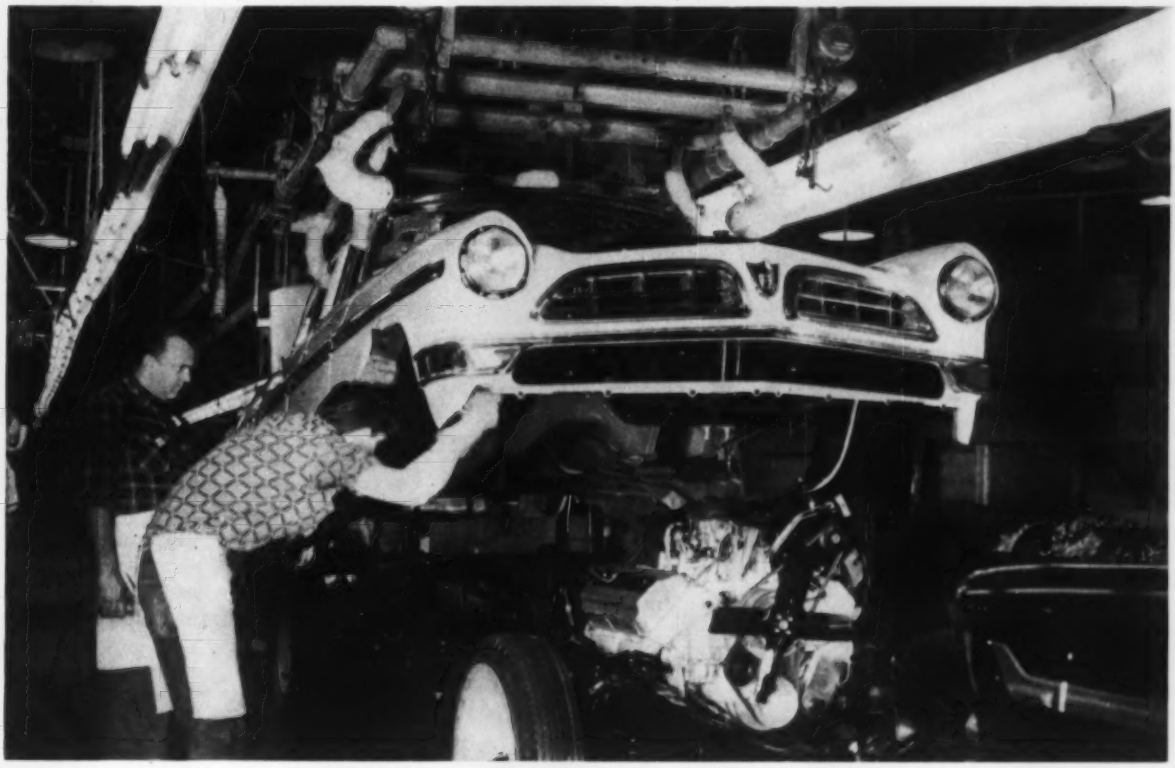
Precision control tests such as this one are applied at every stage of production to assure you the quality of steel required for your product and production methods.

At Great Lakes Steel, the emphasis is on quality and service. Where your production problems involve steel—and particularly flat-rolled steel—we invite you to make them *our* problems. Great Lakes Steel is as close as your telephone.

GREAT LAKES STEEL CORPORATION

Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION



Canadian Plymouths, Dodges, DeSotos and Chryslers are all built on one assembly line

Renaissance for Chrysler of Canada, Too

CHRYSLER WINDSOR, usually associated with the model named for the man who gave up his throne, also refers to Chrysler Corp.'s Canadian facilities in Windsor, Ont.

The Maxwell plant acquired by Chrysler Corp. in 1925 (it had a whopping employment of 181) was built up during the prewar days to the point where it was supplying one-third of the Canadian auto market. After the war, adequate manufacturing facilities and capacities to take advantage of the expanding market were lacking.

Changes Ahead—From 33 per cent, Chrysler's share of the market declined to only 15 per cent of Canada's passenger car business, even though plants were producing at full capacity. To de-

How Chrysler Views Canada*

Canada's population—17 million by 1961, 19 million in 1971. The working force—a jump from 5.3 million in 1951 to 6 million in 1961, to 7 million in 1971.

Consumer Spending—From $11 billion in 1951 to $15 billion in 1961, $22 billion in 1971.

Production—In constant dollars, up 30 per cent by 1961 and a further 40 per cent by 1971.

Households—3.5 million in 1951 to 4.3 million in 1961, more than 5 million in 1971.

Passenger Cars—2.5 million in use in 1951, 3.25 million by 1961, more than 4 million in 1971. A car for every 4.3 Canadians in 1971. Now—one for every 5.7.

*From the survey made for Chrysler by Canadian Economic Research Associates

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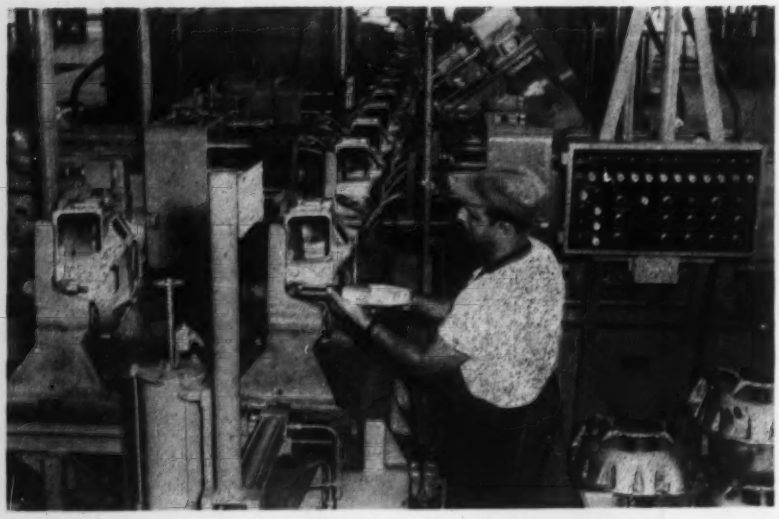


Chrysler of Canada uses automation on the transmission housing

termine expansion needs not only for the immediate period but also for the years ahead, a panel of economists was convened to compile a report on Canada's economic outlook. Based on it (see box, preceding page), a long-range plan was formulated, and Chrysler went to work.

In 1953 a $50-million expansion program was announced, the initial phase of that planning. Its immediate objective was to get Chrysler back its one-third of the Canadian car market. For the first six months of 1955, passenger car sales captured 24 per cent of the total market, compared with only 15 per cent a year ago.

Expansion — Until last December, Chrysler of Canada could produce only 256 cars a day. At present, the plant is producing 480 cars a day, and new facilities shortly will permit production to be stepped up to 600 units a day.

The largest single investment in the expansion is the V-8 engine plant now nearing completion. Entailing an expenditure of about $30 million, the plant is equipped to manufacture Plymouth, Dodge and Chrysler polyspherical engines. Hemispherical components will continue to be manufactured in the U. S. and shipped to Canada for assembly.

Engine Flexibility — The plant will continue to produce the 6-cylinder engines previously produced there, but E. C. Row, president and general manager, notes that capacity is available to produce all V-8s should the need arise. Use of automation is extensive, with much of the machinery shipped in from the U. S. An interesting sidelight is the situation where machinery not produced in Canada may be shipped into the country duty free.

Impressive is the paint facility where 27 miles of piping carry the 20 standard colors from mixing rooms to spray booths. Similar to newer Chrysler paint installations in this country, the setup provides for 495 different color codes available in Chrysler of Canada lines this year.

More Assemblies—In addition, and perhaps most fundamental, the size of the passenger car assembly plant was doubled. This permits two-shift operation. Employment has increased 67 per cent over 1954 levels. That's over 10,000 workers this year compared with 4414 in 1945.

This facility is interesting particularly because Chrysler, DeSoto, Dodge and Plymouth cars are manufactured on a single final assembly line. The Canadian Dodge is a Plymouth with Dodge hood, grille and trim. Forty different models come down the 3400-ft line. Component inventories are kept at a five-day supply in the building, which has over 1.4 million sq ft of floor space. Output this year is targeted at 87,000 cars.

From U. S.—Large stampings come into the plant from the U. S. It's only about 15 miles from the Nine Mile stamping facility of Chrysler Corp. in Detroit to the Windsor factory.

Under law, 60 per cent of a car's value must be of Canadian content. So long as this figure is met or bettered, parts that must be imported are permitted to enter the country duty free—body stampings and frames are the main items, along with automatic transmissions and, until now, V-8 engines. Mr. Row estimates Canadian content at about 68 per cent. Canadian vendors will be paid about $125 million by Chrysler of Canada this year. As a matter of policy, the firm attempts to purchase parts from Canadian vendors, retaining an engineering staff to work with Canadian suppliers on the components they can produce.

Direct Contact—Formerly on a distributorship basis, the company's 1250 auto dealers work directly under the factory. Direct contact with them has helped the company get a quick boost in sales.

So, 1955 is a year of decision for Chrysler of Canada, much as it has been considered for its counterpart in the U. S.

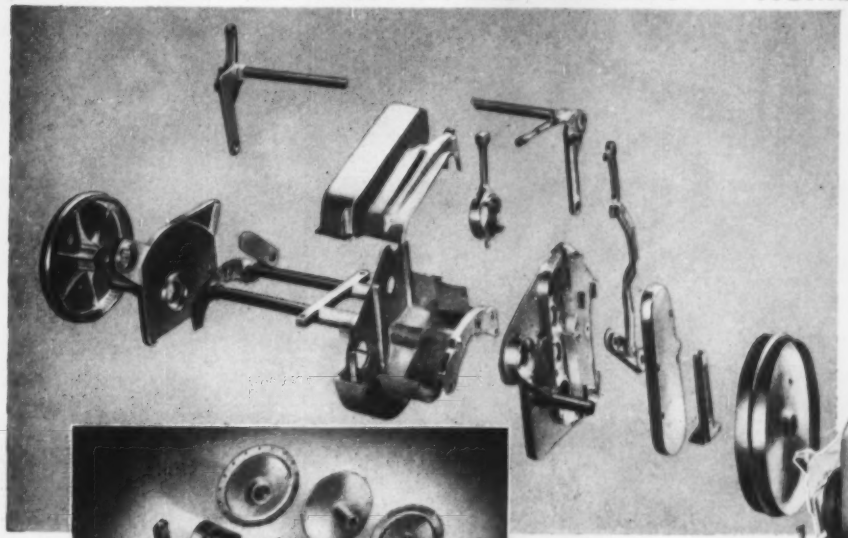
Auto, Truck Output

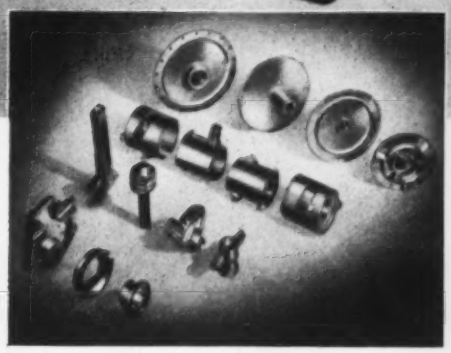
U. S. and Canada

	1955	1954
January	780,780	594,467
February	770,530	574,215
March	955,027	672,858
April	936,994	676,269
May	913,257	621,318
June	825,031	635,540
July	815,061†	543,344
August		523,799
September		364,441
October		312,078
November		616,395
December		761,954
Total		6,896,678
Week Ended	**1955**	**1954**
July 9	167,288	106,169
July 16	207,627	130,757
July 23	208,413	130,744
July 30	199,788	130,523
Aug. 6	172,139†	124,168
Aug. 13	175,000*	119,208

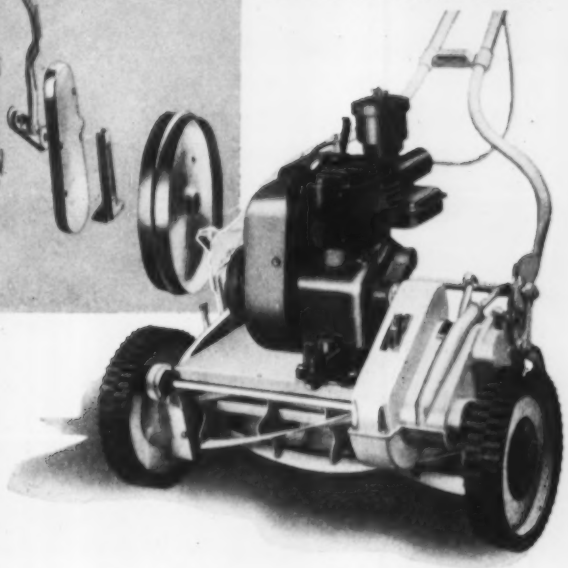
Source: *Ward's Automotive Reports*. †Preliminary. *Estimated by STEEL.

WHY ZINC RATES FIRST IN DIE CASTING • NUMBER 2 OF A SERIES





◀ *The castings pictured at the left can be identified readily on the finished mower, while those in the group below are hidden in the assembly. A total of 32 ZINC die castings are used in the machine itself and two more on the handle.*



toughness – as proved by CLEMSON

In designing the new reel-type "Power Drive" mower, Clemson Bros., Inc. has employed ZINC die cast components wherever possible—with full assurance of their durability. Behind this decision lies over 15 years of outstanding performance of ZINC die castings in Clemson's well-known hand mower. And the use of this metal and method of production not only insures efficient, dependable service, but provides smooth surfaces for a finished appearance that could not be matched at comparable cost by any other means of manufacture.

The impact strength of ZINC die castings exceeds that of the other commonly used die casting alloys. And this ability to withstand sudden shock is only one of the strength characteristics which account for the preference for ZINC. Outstanding in tensile and compressive strength, as well as in ductility and hardness, ZINC die castings get the call where *toughness* is an important consideration.

High strength is just one of the many reasons why ZINC rates first in die casting. We suggest that you watch these pages in the months ahead for other examples of ZINC die casting advantages in product design. In the meantime, send for our new brochure and contact any commercial die caster for assistance in solving your particular production problems.

The New Jersey Zinc Company
160 Front St., New York 38, N. Y.

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The Research was done, the Alloys were developed, and most Die Castings are based on
HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

RB&W FASTENERS - *Strong Point of any assembly*

Putting the squeeze on wire for a better bolt or nut

HERE's wire rod squeezing through a succession of drawing dies at RB&W. Why draw wire when it can be purchased in standard dimensions? Because it's a form of quality control that helps make better fasteners.

RB&W has a whole battery of machines to handle round and rectangular stock, even up through 1-inch size. Above you see Dominick DeCarlo keeping a keen eye on rod destined to become cold upset bolts. He's typical of many RB&W people . . . been with the company over 15 years.

He's doing a job that more accurately sizes the material . . . strengthens it . . . assures its uniformity . . . permits control of the coating used and, therefore, of the finish obtained.

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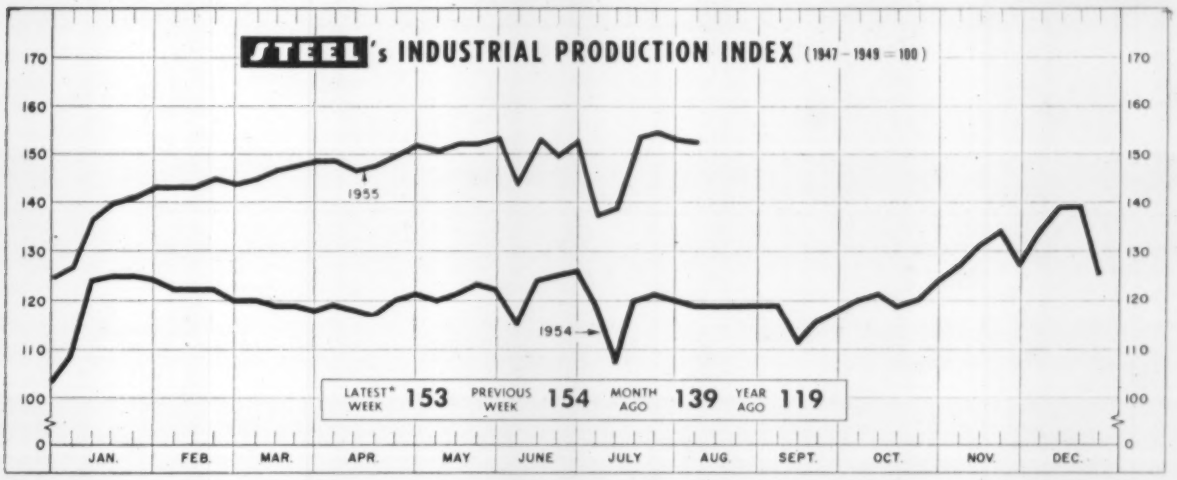
Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N.Y.

Plants at: Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Seattle. **Distributors** from coast to coast.



*Week ended Aug. 6. Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Auto Assemblies 11%

Inventories Inch Ahead But Lag Sales

INVENTORY GROWTH will give additional push to the usual fall business upturn. But the pell-mell stocking of 1953 must be counted out.

Inventory managers remember too well the top-heavy days of last year to fall into the trap again. That's one reason inventories have risen much slower than sales. Tight supplies in copper and aluminum, and to a lesser extent in steel, also have acted as a brake (see STEEL, Aug 1, p. 35, and p.185, this issue).

Sales—In July last year, for example, manufacturers' sales hit their 1954 low of $21.7 billion; inventories at $43.4 billion were about double that. As of June this year, sales had climbed to $27.4 billion, but inventories were up to only $43.9 billion, reports the Commerce department. Those figures compare with 1953 peaks of $26.8 billion for sales and $46.2 billion for inventories.

High sales have held inventories down, and little, if any, slowdown appears in the near future. The crux is new orders. As of June they showed no signs of backing down from the spectacular pace that began slowly a year ago and picked up speed early this year.

Buying—Orders hit their 1954 low in July at $20.9 billion after a slide from the 1953 high of $26.3 billion. In both March and June of 1955, they hit $28.3 billion. July and August totals certainly will be off that lofty pace, but that's the usual summer pattern. A comeback in early fall is virtually certain.

The question is, how much of that ordering is for inventory? A. W. Zelomek, economist for International Statistical Bureau Inc., tells the National Association of Purchasing Agents that the rise in the last quarter of this year will be close to double the second-quarter rate—but still well under the pace of early 1953.

Building—The "sensitive point" will be reached, he says, in the first half of next year. By then,

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,192[1]	2,098	1,525
Electric Power Distributed (million kw-hr)	10,650[1]	10,727	9,059
Bitum. Coal Output (1000 tons)	9,600	9,400	7,517
Petroleum Production (daily avg.—1000 bbl)	6,630[1]	6,616	6,153
Construction Volume (*ENR*—millions)	$317.7	$366.2	$368.6
Automobile, Truck Output (*Ward's*—units)	172,139[1]	199,788	124,168
TRADE			
Freight Car Loadings (1000 cars)	786[1]	796	668
Business Failures (Dun & Bradstreet, no.)	212[1]	201	207
Currency in Circulation (millions)[3]	$30,236	$30,157	$29,893
Dept. Store Sales (changes from year ago)[3]	+13%	+12%	+1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,482	$20,455	$19,884
Federal Gross Debt (billions)	$277.2	$277.3	$274.6
Bond Volume, NYSE (millions)	$17.4	$18.7	$20.0
Stocks Sales, NYSE (thousands of shares)	10,543	11,165	15,943
Loans and Investments (billions)[4]	$84.9	$85.2	$81.4
U. S. Govt. Obligations Held (billions)[4]	$32.2	$32.6	$34.2
PRICES			
STEEL's Finished Steel Price Index[5]	207.63	207.63	195.87
STEEL's Nonferrous Metal Price Index[6]	241.1	240.2	215.6
All Commodities[7]	109.8	109.9	110.1
Commodities Other than Farm & Foods[7]	116.4	116.3	114.4

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278. 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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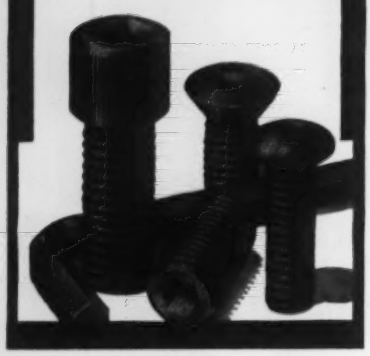

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2. **LEADER POINT CAP SCREWS,** for substantially reduced chance of thread injury or damage to threaded holes.
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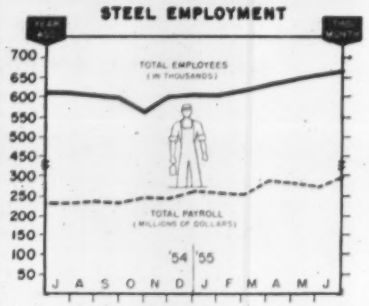
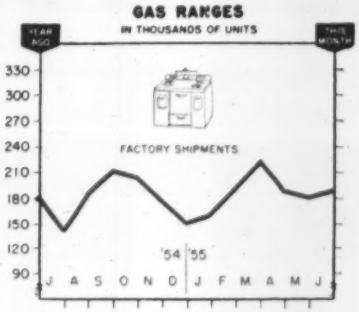
THE BUSINESS TREND



	Employment in Thousands		Payroll In Millions	
	1955	1954	1955	1954
Jan.	605	645	$258.8	$251.3
Feb.	616	636	255.1	236.6
Mar.	630	621	288.2	249.7
Apr.	642	609	282.0	232.6
May	654	606	294.1	234.4
June	667	609	298.4	236.4
July	....	608	....	232.8
Aug.	....	601	....	238.8
Sept.	....	597	....	234.6
Oct.	....	596	....	244.7
Nov.	....	599	....	247.7
Dec.	....	605	....	262.2

American Iron & Steel Institute
Charts copyrighted, 1955, STEEL



	Shipments—Units		
	1955	1954	1953
Jan.	152,900	137,000	169,200
Feb.	186,200	152,900	185,900
Mar.	217,300	188,200	208,200
Apr.	182,300	172,400	220,300
May	175,100*	163,800	181,000
June	182,000	174,300	166,600
July	.....	134,500	159,000
Aug.	.....	179,400	186,800
Sept.	.....	203,900	209,500
Oct.	.....	197,100	203,900
Nov.	.....	174,000	158,500
Dec.	.....	147,300*	134,400
Total	.....	2,024,800	2,183,300

Gas Appliance Mfrs. Assn.
*Preliminary

inventories may be building faster than the 1953 rate.

But there are brakes that may hold growth below the sensitive point—such as continuing high sales, rapid changes and improvements in products, and the watchful eye management is keeping open to guard against overstocking.

More Hiring Ahead . . .

Employment is catching up with record business activity. Prospects are for further gains in early fall, says the Labor department. Especially encouraging is the report that the range of industries stepping up hiring is continuing to widen.

More jobs are expected to open up in steel, electrical machinery and furniture, offsetting the dip in auto employment that model change-over will bring.

Three-fourths of 149 major employment centers expect employment gains. Most predictions of drop-offs put them on the small side, even in the key auto producing spots. As a result of recent gains, the number of areas with labor surplus problems dropped to an 18-month low.

Building Holds High . . .

Helping push up employment totals is the booming construction industry. Value of new construction in July was at a new monthly peak of almost $4 billion, topping off a record $23.1 billion for the first seven months of the year.

Residential and commercial building and highway work were the high points in the 4-per-cent jump during July. Industrial building is hanging on to its new-found strength that began earlier this year. Outlays in July were $197 million, compared with $158 million a year ago.

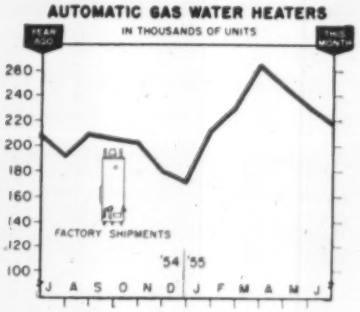
Railroad Income Gains . . .

Railroad business continues to pick up. Net income in the first half almost doubled that of the same period of 1954—$416 million, compared with $232 million. In June, income was $88 million; a year ago, $60 million.

That's one of the reasons behind the influx of new freight car orders that jumped backlogs 11,000 cars during June. The sudden spurt, though, has brought its own problems with it. Noting the "considerably improved" backlog on the company's books, Samuel J.

AUTOMATIC GAS WATER HEATERS

IN THOUSANDS OF UNITS

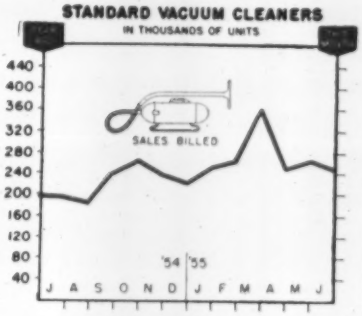


	Shipments—Units		
	1955	1954	1953
Jan.	210,900	164,400	189,900
Feb.	228,400	175,000	194,200
Mar.	263,100	187,800	207,400
Apr.	245,200	200,800	209,500
May	229,400	195,600	183,300
June	216,500	206,700	181,200
July		190,300	178,900
Aug.		207,100	168,100
Sept.		205,500	179,000
Oct.		202,000	194,300
Nov.		179,100	155,000
Dec.		166,800	141,900
Total		2,281,100	2,182,700

Gas Appliance Mfrs. Assn.

STANDARD VACUUM CLEANERS

IN THOUSANDS OF UNITS



	Sales Billed—Units		
	1955	1954	1953
Jan.	250,123	221,233	255,886
Feb.	262,651	199,035	246,007
Mar.	358,179	276,464	329,294
Apr.	244,143	220,849	268,548
May	261,238	209,434	252,404
June	241,665	195,781	197,506
July		193,807	159,446
Aug.		185,397	188,536
Sept.		238,235	227,253
Oct.		263,197	249,383
Nov.		237,882	216,227
Dec.		217,022	190,773
Total		2,658,136	2,781,263

Vacuum Cleaner Mfrs. Assn.

Walker, president, Chicago Railway Equipment Co., says: "Due to rapid increase in freight car buying and the high demand for steel by other industries, a potential increase in production over the remainder of the year may be affected by difficulty in obtaining steel."

Coal Burns Brighter . . .

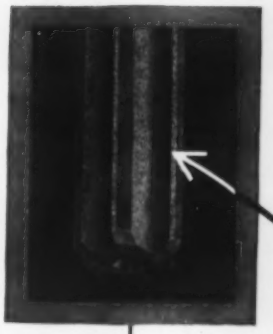
This year's climb in the coal business is being felt by metalworking. "During the quarter, ended June 30, 1955, net sales from our factories totaled $21,361,301, the highest in our history. Bookings of new orders were even greater," states J. D. A. Morrow, president, Joy Mfg. Co.

Joy has earmarked over $700,000 for cranes and machine tools to step up production—much of the equipment to be installed as soon as possible. A like amount will be spent on plant expansion.

In the auto industry, large scale cutbacks for model change-over are just around the corner. Lincoln, down for eight weeks, is about to start production for early September introduction. Of the four Chrysler divisions only Plymouth is still going strong. Tapering off is evident at General Motors. Ford, hoping to come out on top in its best seller battle with Chevrolet, is still roaring along in high gear, according to *Ward's Automotive Reports.*

Trends Fore and Aft . . .

Outlook for production and delivery of military and commercial aircraft components and accessory systems is expected to continue at the current high rate for the next 12 months, says W. C. Whitehead, executive vice president, Garrett Corp. . . . There are indications that the recent increases in costs (materials and labor) are forcing more realistic pricing in the competitive (valve) market, notes Ernest Cochran, president, Chapman Valve Mfg. Co. . . . Sales by Robertshaw-Fulton Controls Co. during the first six months were at the highest rate in the company's history despite lower defense business, reports John A. Robertshaw, president. He sees the favorable sales trend continuing for the rest of the year . . . Foundry equipment orders in June were highest since August, 1953, reports Foundry Equipment Manufacturers Association. Order index was 186.8 (1947-1949 = 100), topping off a rise started in March.



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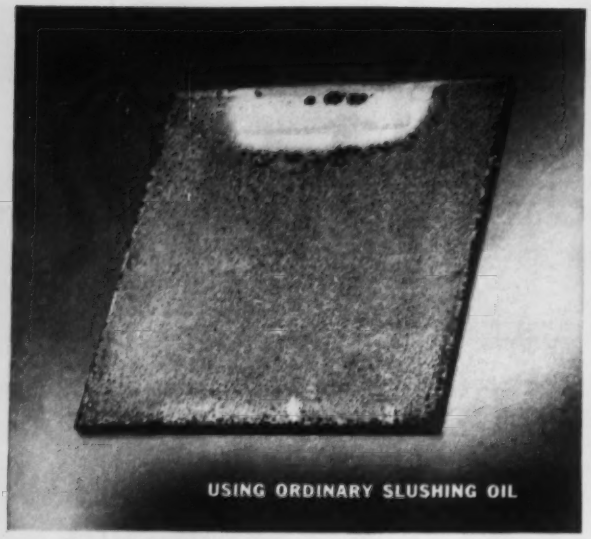

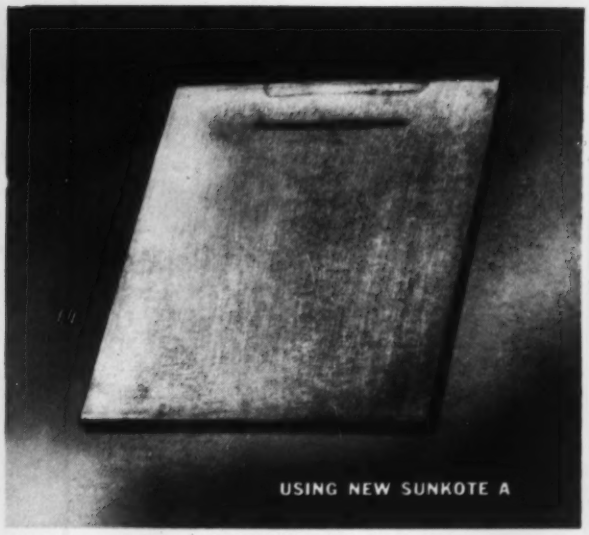

Humidity Cabinet Test proves superiority of new coating oil. Using ordinary slushing oil, steel test panel (on left) shows harmful rust after only 100 hours in humidity cabinet with relative humidity of 100% at 120 F. An identical steel test panel (above right), protected by new Sunkote A, shows no rust or stain whatsoever after 200 hours under same rust test conditions of high humidity and temperature.

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a new, low-cost rust preventive coating for hot and cold rolled strip and sheet steel

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Economical to use, Sunkote A is moderately priced... gives maximum coverage and protection... can be applied by all usual methods... is easily removed by any of the normal cleaning processes.

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T. S. BONNEMA
. . . Oster vice pres. and gen. mgr.

T. S. Bonnema was elected vice president and general manager, **Oster Mfg. Co.**, Cleveland. With Oster since 1922, he was vice president and factory manager.

Shippers' Car Line Corp., a subsidiary of ACF Industries Inc., New York, appointed **Thomas J. Rowe** vice president. With ACF Industries since 1953, he was resident comptroller of Shippers'.

Gordon Dean was elected senior vice president-nuclear energy, **General Dynamics Corp.**, Groton, Conn. He will co-ordinate atomic energy activities.

Charles D. Dorworth was appointed director of personnel, **Alan Wood Steel Co.**, Conshohocken, Pa. With Alan Wood since 1917, he was manager of safety and welfare.

Organizational changes in sales at **Fellows Gear Shaper Co.**, Springfield, Vt., include: **Carl S. Rice**, sales manager-cutter division; **J. F. Hronek**, sales manager-plastics division; and **George H. Sanborn**, general sales manager.

Richard C. Rowley was promoted to regional sales manager, headquartered in Dallas, **Motorola Inc.** **Samuel M. Whisler** was named manager of customer services to succeed Mr. Rowley at Chicago.

EDWARD L. DREYER
. . . president at Adamas Carbide Corp.

Edward L. Dreyer was appointed president, **Adamas Carbide Corp.**, Kenilworth, N. J. He was executive vice president and general manager.

Griswold A. Price was appointed assistant vice president - sales, western area, **U. S. Steel Corp.** Former manager of the Chicago district office, he succeeds **Herbert J. Watt**, retired.

Fred L. Shanklin was made vice president and general manager of **Union Carbide and Carbon Corp.'s** ore division, New York. With Union Carbide since 1934, he was division manager of administration.

David Swan was made director of research-metals, **Electro Metallurgical Co.**, a division of Union Carbide & Carbon Corp., at Niagara Falls, N. Y.

William A. Kirkpatrick and **Robert Swan III** were elected assistant controllers, **Allegheny Ludlum Steel Corp.**, Pittsburgh. Mr. Kirkpatrick was manager of budgets and statistics; Mr. Swan, manager of cost accounting.

Howard E. Miller was named assistant chief metallurgist of the Cleveland steel plant, **Republic Steel Corp.** He will be in charge of metallurgical operations at Republic's 98-in. strip mill.

KENNETH F. MAXCY JR.
. . . Pittsburgh Steel planning dept. mgr.

Kenneth F. Maxcy Jr. was promoted to manager of a new production planning department, **Pittsburgh Steel Co.**, Pittsburgh. The department will supervise all order processing, central and mill scheduling and in-process steel inventory.

James P. McNally was made sales manager, **Bart Mfg. Corp.**, Belleville, N. J.

Joseph T. Ryerson & Son Inc., Chicago, elected **Merle A. Miller** vice president and treasurer and **Raymond N. Carlen** vice president. Mr. Miller was treasurer and assistant secretary and Mr. Carlen assistant vice president.

Leo J. Pantas, general manager of the Yale Lock and Hardware Division, was elected vice president, **Yale & Towne Mfg. Co.**, New York.

Wheeling Steel Corp., Wheeling, W. Va., named **Linford J. Wilson** assistant comptroller. He has been with the company since 1945.

William M. Yates was appointed director of the patent department, **Dow Chemical Co.**, Midland, Mich. He succeeds **Edward C. Burdick**, retired.

Alexander Shearer was promoted to assistant to the operating vice president, **Wheeling Steel Corp.**,

WILLIAM G. LAFFER

WILLARD W. BROWN

. . . Clevite Corp. and Cleveland Graphite Bronze presidents

Wheeling, W. Va. He was manager of production.

Clevite Corp., Cleveland, elected **William G. Laffer** president to succeed **James L. Myers** who is retiring as president but will continue as chairman of the board. **Willard W. Brown**, vice president-marketing for Clevite, succeeds Mr. Laffer as president of the Cleveland Graphite Bronze Co. division.

Permutit Co., New York, appointed **H. M. Appleton** assistant plant manager of the Lancaster, Pa., manufacturing division and **H. Plymire**, plant superintendent.

Wallace Jay was named manager of general accounting at the Fort Worth, Tex., plant of **Convair**, a division of General Dynamics Corp. He replaces **Frank P. Parker**, who resigned to become comptroller at Arma division, American Bosch Arma Corp.

Simplex Valve & Meter Co., Lancaster, Pa., appointed **Frank E. Gerlitz** vice president-sales. He was sales manager.

J. Kneeland Nunan fills the new post of vice president and staff adviser to Philip S. Fogg, president of **Consolidated Engineering Corp.**, Pasadena, Calif. Succeeding Mr. Nunan as president of Consolidated's subsidiary, Consolidated Vacuum Corp., Rochester, N. Y., will be **Hugh F. Colvin** who continues as vice president and general manager of the parent company.

Robert P. Hindman was named assistant to the general superintendent at **Armco Steel Corp.'s** Butler, Pa., works. **Samuel J. MacMullen**, former supervising metallurgist, succeeds Mr. Hindman as works metallurgist.

Abrasive Machine Tool Co., East Providence, R. I., promoted **Walter P. R. Sceeles** from sales manager to assistant to the president. **Joseph T. Vinbury**, former advertising and sales promotion manager, New Britain Machine Co., will be general sales manager.

Sterling W. Galloway was made regional manager for **AC Spark Plug Division**, General Motors Corp., with headquarters in San Francisco. He replaces **A. A. Williams**, resigned.

Richard J. Silver was promoted to assistant manager-merchant bar sales and **Thomas H. McWilliams** salesman, **Connors Steel Division**, H. K. Porter Company Inc., Pittsburgh.

Robert D. Stottlemyer was appointed northwest division manager, **National Supply Co.**, Pittsburgh. He succeeds **Kenneth O. Hoevel**.

Jack A. Stiehl was appointed manager of contract administration at **Northrop Aircraft Inc.**, Hawthorne, Calif.

Donald G. Schaffert was appointed assistant to the works manager, **Northeastern Steel Corp.**, Bridgeport, Conn. He was assistant superintendent of the melt shop, **Copperweld Steel Co.**

Walter J. Holder was appointed central district sales manager, with headquarters at Chicago, **Houdaille-Hershey of Indiana Inc.**

E. B. Hill was named to the new position of assistant to the president, **Koehring Co.**, Milwaukee. He was vice president and director

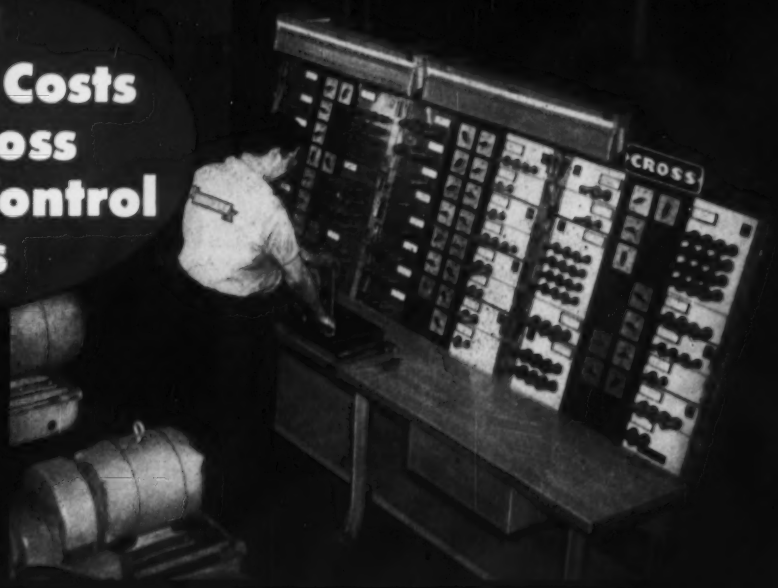
JOSEPH T. VINBURY

WALTER P. R. SCEELES

. . . Abrasive Machine Tool Co. executive posts

A Mechanical Eye . . .

Ford Cuts Tool Costs with Cross Machine Control Units



One of the Cross Machine Control Units at Ford Motor Company's Cleveland Engine Plant

(U. S. Patent Nos. 2679038 and D-163935. Others pending)

According to records, 221 Cross Machine Control Units in operation at Ford Motor Company Plants are assisting them greatly in improving tool trouble conditions.

One reason for this is that the Machine Control Unit provides a definite and convenient place for storing tools . . . tools which are pre-set so they can be placed in operation immediately without making machine adjustments.

Another reason is that the Cross Toolometer, an integral part of the Machine Control Unit, provides a standard for the performance of the tools, thereby enabling corrective action to be taken when necessary. The Toolometer dial is set to indicate the number of pieces which a given tool should produce. When the dial has reached that pre-determined figure, the machine automatically shuts down and the tools are changed. At the same time, other tools indicated by the Toolometer as approaching the end of their usefulness are also changed to take full advantage of the machine shut down.

The Cross Machine Control Unit is helping to keep Ford production going and is also assisting greatly in controlling tool life.

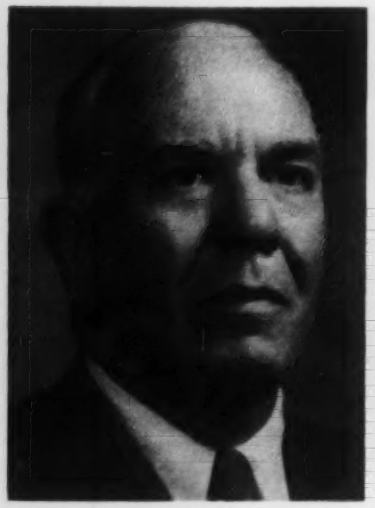
See us in Booth No. 1118 at the Machine Tool Show

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS



MAX RIEBENACK III
. . . president at Industrial Brownhoist

of sales, advertising and export sales, Gar Wood Industries Inc.

Max Riebenack III was elected president, **Industrial Brownhoist Corp.**, Bay City, Mich. He was executive vice president. **Stanley R. See** was elected vice president and assistant to the president.

Joseph F. Flanagan was appointed purchasing agent for the metal container plant, **Continental Can Co.** His offices will be in Los Angeles.

Eclipse Air Brush Co., Newark, N. J., appointed **James L. Whalen** sales manager.

Thomas E. Ban was made director of research, **McDowell Co. Inc.**, Cleveland.

DONALD M. PATTISON
. . . Motch & Merryweather marketing dir.

Donald M. Pattison was made director of marketing, **Motch & Merryweather Machinery Co.**, Cleveland. He was with Warner & Swasey Co. for more than 25 years, most recently as vice president-sales.

Albert H. Hoffman was named an assistant comptroller, **National Lead Co.**, New York. **Charles F. Peters** replaces him as comptroller of the titanium division. **Walter J. Hawley** is comptroller of the St. Louis and southwestern branches.

Aluminum Co. of America, New York, appointed **J. Colin Smith** manager of the New York district sales office. **Harold A. Faisst**, former manager of the Richmond, Va., branch sales office, becomes district manager at Seattle.

JOHN R. TUTTLE
. . . Crouse-Hinds pres. and chairman

John R. Tuttle was made president and chairman of the board, **Crouse-Hinds Co.**, Syracuse, N. Y. He replaces **William L. Hinds** as chairman and **Albert F. Hills** as president. Both men are retired.

Ronald L. Loup was made director of the development engineering division, **Progressive Welder Sales Co.**, Detroit.

Roy Hales was made purchasing agent for **Superior Steel Products Corp.**, Milwaukee. He formerly was with the Nordberg Mfg. Co.

Kenneth Lieber was appointed assistant vice president-sales, **National Tube Division**, U. S. Steel Corp., Pittsburgh. He was vice president-engineering, Consolidated Western Steel Division.

OBITUARIES . . .

Richard Samuel Reynolds, 73, founder and chairman of the board, **Reynolds Metals Co.**, Richmond, Va., died July 29.

Francis Joseph Stokes, 81, founder and chairman of the board, **F. J. Stokes Machine Co.**, Philadelphia, died Aug. 1.

Edward H. Lloyd, 67, president, **Edward H. Lloyd & Son Co.**, Boston, died July 30.

John D. Hysong, 52, Chicago district sales manager, **Basic Refractories Inc.**, Cleveland, O., died July 23.

H. L. Andrews, 65, president, **Jones & Lamson Machine Co.**, Springfield, Vt., and a former vice president of General Electric Co., died Aug. 4.

Lawrence E. Kunkler, 54, president, **Metallizing Co. of America**, New York, died Aug. 1.

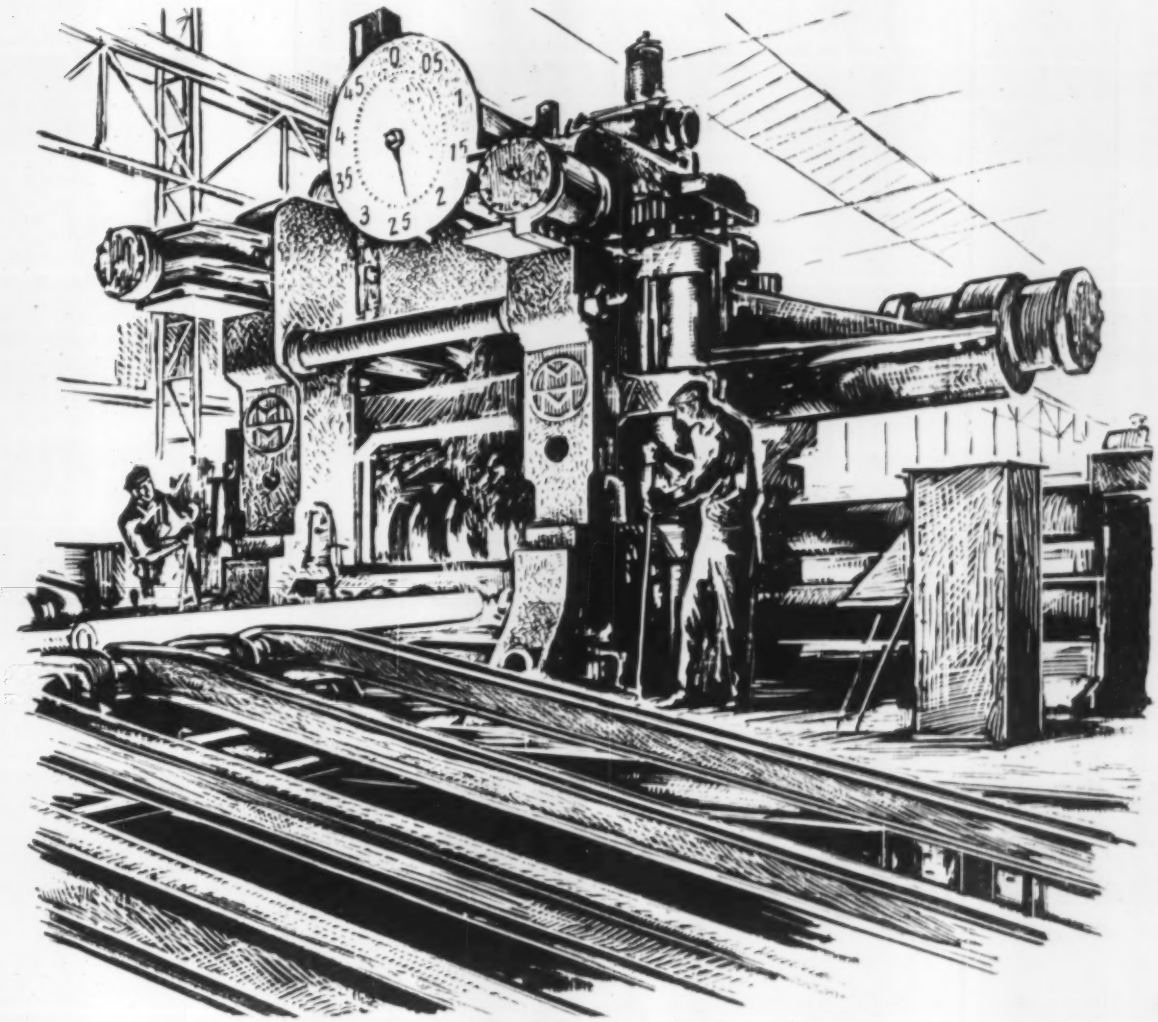
Ernest Francis Watts, 49, vice president, **Binks Mfg. Co.**, Chicago, died July 30.

Douglas T. Mitchell, 51, founder and president, **American Radio Hardware Co. Inc.**, Mt. Vernon, N. Y., died Aug. 2.

Robert E. Kennedy, 68, secretary of **American Foundrymen's Society**, Chicago, from 1925 to 1945 when he became secretary emeritus, died Aug. 7.

Warren A. Peterson, 46, president, **Peterson Products Corp.**, Highland Park, Ill., died July 30.

John Pemberton, 94, retired superintendent, **General Electric Co.**, Lynn, Mass., died July 28.



More and Better Seamless Pipe from Newest Automatic Mills

High operating rates of more than 3 pieces per minute of 45 feet long seamless pipe are attainable with Mannesmann-Meer's latest automatic plug mill design.

Besides this high production capacity, new and outstanding developments in mill and mandrel bed design feature extremely quick schedule changeover to cut costly downtime.

More than 65 years of unmatched experience in mill operation and mill design puts us into a position to offer you a combination of

- CREATIVE ENGINEERING
- DESIGN EXPERIENCE
- OPERATING BACKGROUND
- AMERICAN MANUFACTURING SKILL

which is nowhere else ready to go to work for you.

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ENGINEERING AND CONSTRUCTION COMPANY, 900 LINE STREET, EASTON, PENNA

WORLD SPECIALISTS IN HIGH-SPEED TUBE MILL MACHINERY

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SPACE 1219

SEE . . .

NEW
- No. 2E Vertical Precision Hole Grinder
- No. 3C Die Sinker
- Velvetrace Milling Machine
- BL 3622 Model C Keller Machine
- BG-21 Keller Machine
- 48" Vertical Rotary Table
- 24" Plain Optical Rotary Table
- 42" Plain Rotary Table with Automatic Positioning
- Potter & Johnston Automatic Turret Lathes
- Sigmatic Gaging Machines
- "Automation" Gages and Feed Back Controls

ALSO
- Model "C" Toolroom Lathe
- Vertical Die and Surface Grinder
- Universal Die Sinker
- Electrolimit Jig Borers
- End Measure Type Jig Borer
- Kellerflex Machines and Burs
- Pneumatic Grinding Head
- Plain, Tilting and Vertical Rotary Tables
- Comprehensive Display of Precision Cutting Tools
- Comprehensive Display of Standard Gages and Comparators

PRATT & WHITNEY

DIVISION NILES-BEMENT-POND COMPANY

WEST HARTFORD 1, CONNECTICUT, U.S.A.

FIRST CHOICE FOR ACCURACY SINCE 1860

MACHINE TOOLS • CUTTING TOOLS • GAGES

Simonds Diversifies

Products of its new subsidiary, Heller Tool Co., open up new sales potential

SIMONDS SAW & Steel Co., Fitchburg, Mass., is operating the plant of Heller Bros. Co., Newcomerstown, O., under the name of Heller Tool Co. The addition of Heller-made items increases diversification of products made by Simonds and its affiliated companies, with opportunities for expanded sales in new and related markets.

The Heller firm is in the general industrial, hardware, automotive and aircraft fields. It is one of the country's oldest manufacturers of Swiss pattern, milled curved tooth and rotary files, as well as American pattern files and rasps. It also produces a wide variety of hammers, chisels, scrapers, trowels, punches, countersinks, internal grinding burrs and other tools used in the plumbing, smithing, building and construction trades.

These products augment Simonds' lines of circular and band saw blades, machine knives, hacksaw blades, American pattern files, circular cutters and slicers, special steels, grinding wheels, abrasives and other items.

Stamper Enlarges Plant

Northern Metal Products Co., Franklin Park, Ill., added 21,000 sq ft of space to its plant for production of contract metal stampings and metal fabricated parts.

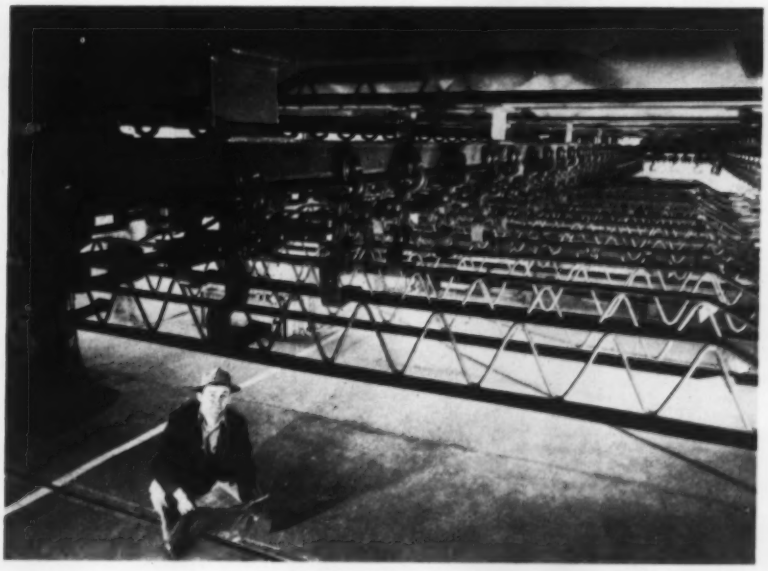
Kaiser Opens Sales Office

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., established a sales office in Union National Bank Bldg., Youngstown. Manager of the office is P. D. Weisse.

Minneapolis-Honeywell Expands

Minneapolis - Honeywell Regulator Co., Minneapolis, will build a 105,000-sq-ft plant in Gardena,

(*Please turn to page* 114)



American Bridge Improves Steel Joist Fabrication

These lightweight, strong structural members were developed by engineers of U. S. Steel Corp.'s American Bridge Division for production on an assembly line. They are being fabricated at the division's Ambridge, Pa., plant. The joists generally in use must be hand welded, while the Ambridge joist is resistance welded on a fast assembly line. First, heavy steel strip is cold-rolled into special U-shaped sections. Bars bent into a "zig-zag" shape are resistance welded between upper and lower sections. Among the important features of the new joist are the uniform electric welding of the structural U-chords and web members, ease of erection and provision for ample freeway for pipe and conduit

Better Built

BUSCHMAN roller conveyors

Feature:

PLAIN BALL BEARINGS

Free-running non-lubricated bearings assure smooth roller rotation . . . ideal for most applications . . . do not retain foreign matter.

DUSTPROOF BEARINGS

True-labyrinth enclosure keeps dust out of bearings . . . rollers remain free-running after years of operation . . . no lubrication necessary.

GREASE-PACKED-FOR-LIFE BEARINGS

For heavy-duty or outdoor applications . . . true-labyrinth seal keeps dirt out and grease in . . . designed for years of maintenance-free operation.

PRESSURE LUBRICATED BEARINGS

When rollers are subjected to severe heat or abrasive materials, true-labyrinth-sealed bearings with Alemite fitting for pressure re-lubrication assure maximum service

. . . TO MEET YOUR REQUIREMENTS

BUSCHMAN produces "better built" roller conveyors for every type of service . . . all are pre-engineered to provide years of economical, efficient materials handling.

C-112-EWB

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Top Tool Conditioning

WITH BAY STATE WHEELS!

Quality cutting tools boost production and cut costs *only* if they are kept in quality condition! For single point tools or complicated cutters . . . steel or carbide . . . there is a BAY STATE wheel to keep quality high and cutting performance at peak efficiency.

Ask your BAY STATE distributor about tool grinding "Wheels of Progress" that keep pace with the rapid progress of modern tools.

SEND FOR LATEST LITERATURE WITH PROVEN SPECIFICATIONS

Here are top tool-conditioning specifications in "Wheels of Progress" . . . well over 150 of them . . each thoroughly proven by industrial use. Send for your copy now.

These specifications and BAY STATE's "On-The-Job" engineering service are an ideal combination for your progress in Tool Room grinding.

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BAY STATE ABRASIVE PRODUCTS CO., Westboro, Massachusetts, U. S. A.

Branch Offices and Warehouses—Bristol, Conn.; Chicago, Ill.; Cleveland, Ohio; Detroit, Mich.; Pittsburgh, Pa.
Distributors — All principal cities
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

Top Brass Says I'M GUILTY

In a way that's correct. Guilty of choosing the *wrong* protection. Fire hit and took off like lightning!

There's a moral to this: Protection that's good for one hazard can burn you out when applied to another.

That is why CARDOX years ago originated "Low Pressure Carbon Dioxide Systems"*—to give safe protection to industry's "hot spots", for which existing protection just wasn't good enough. Since then thousands of CARDOX Systems have been installed for just about every kind of flammable liquid and electrical hazard you can think of —and scores of Class A hazards as well. *Fire savings to industry total up to many millions of dollars.*

CARDOX applies carbon dioxide as readily in *tons* as in pounds. Under the overwhelming attack of CARDOX CO_2 little fires are snuffed out instantly, big fires almost as fast.

CARDOX' unique experience in low pressure carbon dioxide is at your disposal. A survey of your hazards and our frank report costs you nothing—can be the first step toward turning fire in your plant into an incident instead of a disaster. Write us, please.

*Covered by Patents Issued & Pending

CARDOX

ORIGINATOR OF Low Pressure CO_2

FIRE EXTINGUISHING SYSTEMS

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS

Offices in Principal Cities

(*Concluded from page* 111)

Calif., for increased production of gas appliance controls. It is expected to double present production capacity.

Atwood Buys Press Products

Atwood Vacuum Machine Co., Rockford, Ill., manufacturer of automotive body hardware, trailer couplers, jacks and bicycle accessories, purchased Press Products Inc., Royal Oak, Mich., maker of automotive hardware. The Detroit area plant will be operated by a newly formed corporation, Press Products Co., as a wholly owned subsidiary of Atwood.

Inco Opens Service Center

International Nickel Co. Inc., New York, opened its Southeast States Technical Field Section, Development & Research Division, with headquarters at 3179 Maple Drive, Atlanta. It will furnish industry in the area with technical information and assistance relating to alloys containing nickel.

Westinghouse Forms Division

Westinghouse Electric Corp., Pittsburgh, formed an Industrial Heating Division which combines the functions of the company's induction heating activities, at Baltimore, and the industrial heating department, at Meadville, Pa. L. R. Hague is manager of the new division, with headquarters at Meadville. Products to be manufactured include general industrial furnaces, heaters and thermostats at Meadville and induction heating apparatus at Baltimore.

Solar Officials Buy Mill

Sol H. Friedman, D. A. Friedman and J. B. Ribakoff, officials of Solar Steel Corp., Cleveland, purchased Precision Steel Corp.'s mill at 145 Howard Ave., Bridgeport, Conn. Formerly part of The Stanley Works, it was designed mainly for the manufacture of precision-rolled, high-carbon, cold-rolled spring steel. It specializes in the manufacture of special quality steel (for razor blades and steel tapes) and other high-carbon strip specialties. Sol Friedman,

EXTRACT FROM
MARCH 21st ISSUE OF
STEEL
THE WEEKLY MAGAZINE OF METALWORKING
burization. Output has been g
increased and refractories con-
sumption has not been unduly se-
vere.
At one open-hearth shop in the United Kingdom it is inconvenient to insert the oxygen lance from the front of the furnace. A special water-cooled gun is lowered through the center of the roof opposite the taphole. Evaporated oxygen is blown through the gun at 200 to 210 psi as soon as the bath is melted and the carbon has reached any point below about 0.40 per cent (above this level of carbon the reaction becomes violent). It is usual, depending on the condition of the bath, to feed either oxide or lime or both just before the oxygen blow commences.
Predictable Results—Operation with oxygen is so predictable that
nple is sent to the laboratory
blow begins

This describes the

P.T. OXYGEN GUN

PATENT APPLIED FOR

developed and perfected by THE STEEL COMPANY OF WALES LIMITED for use in open hearth furnaces for rapid decarburisation by jet impingement of oxygen by means of a gun centrally mounted in the furnace roof.

Ten points of advantage:—

Greatly increased rate of carbon removal
Increased production
Reduction of fuel consumption

- Push button control for entry and withdrawal
- No interference with charging
- No interference with tapping
- No reduction in life of roof and lining
- Gun life of 80 or more operations regularly obtained
- Oxygen delivery up to 60,000 cubic feet per hour or more

Proved in use

This type of gun is in regular use on eight 225 net ton furnaces in the Abbey Works Melting Shop of The Steel Company of Wales at Margam. It will also be used on the four 250 net ton furnaces now being installed.

Enquiries should be addressed to:—

The Secretary and Comptroller

THE STEEL COMPANY OF WALES LIMITED

ABBEY WORKS · PORT TALBOT
SOUTH WALES · U.K.

AL STAINLESS STEEL
in various industries

Booklets currently available on the principal uses and methods of handling AL Stainless in the Dairy, Meat and Brewing industries (also Paper, Petroleum, Chemical, Textile, Laundry and Hospital fields). Others in preparation. Write for a copy in the field(s) in which you're interested.

ADDRESS DEPT. 5-681

No material is more at home around food (or beverages, drugs, chemicals, etc.) than AL Stainless Steel. And that's not just because stainless is perennially good-looking, and so easy to keep clean.

Basically, it's because stainless steel equipment is the most economical you can buy. It stands up so much better—lasts so much longer—costs so much less to clean and maintain—that it actually saves you money in the long run. First cost isn't the whole story, you know. It's the long-term, *over-all* cost that counts, and no other material is as hard, strong and resistant to heat, wear and corrosion as stainless steel.

So, when you want equipment that has to look well, maintain high sanitary standards and take a beating every day, remember that only stainless steel can give you the utmost in service and economy. ● Use time-tested AL Stainless, and let us help you work out any design or engineering details. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.***

W&D 5637-B

Make it BETTER-and LONGER LASTING-with

AL Stainless Steel

Warehouse stocks carried by all Ryerson Steel plants

AL ALLEGHENY LUDLUM

president of Solar, assumes the duties of president of Precision Steel.

Continental Can Builds Plant

Continental Can Co., New York, is building a plant in Midland, Mich., for the manufacture of fiber shipping drums.

Two Firms Combine Operations

Grant-MacKenzie Co. and Terminal Steel & Equipment Co. combined operations as of Aug. 1. Offices are at 17650 Ryan Rd., Detroit 12, Mich. Terminal Steel dismantles plants and machinery. Grant-MacKenzie processes scrap iron and metals.

Will Enlarge Utah Plant

McWane Cast Iron Pipe Co., Birmingham, plans to enlarge and revamp the valve and hydrant plant at Provo, Utah, operated by its Pacific States Cast Iron Pipe Co. Division. The project would cost about $1.5 million. Application has been made for tax relief and quick amortization.

Dobeckmun To Build Plant

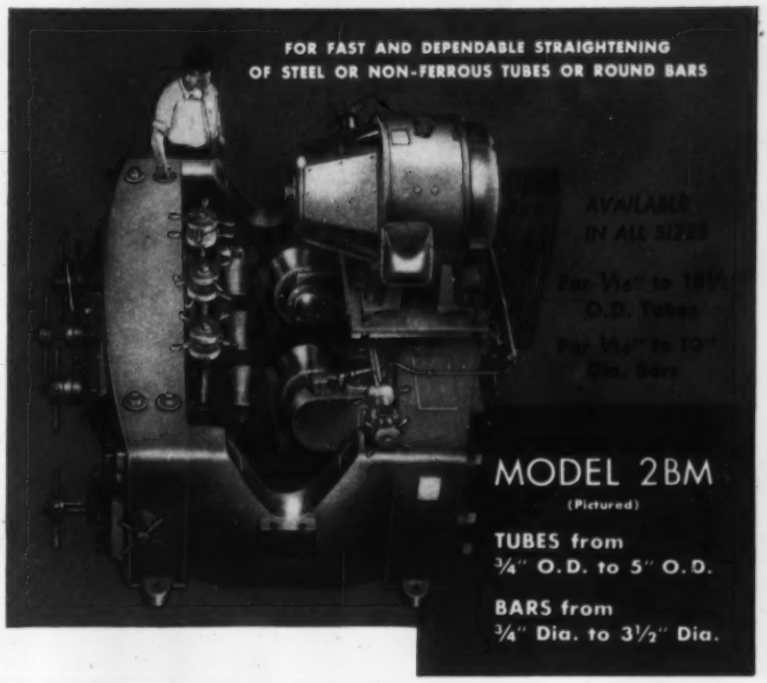
Dobeckmun Co., Cleveland, will erect a plant with about 100,000 sq ft of floor space to house the manufacturing and office facilities of its Industrial Division. This will release the entire facilities of the main plant for products of its Packaging Division. The new building and equipment will cost about $1,750,000.

American Pulley Buys New Line

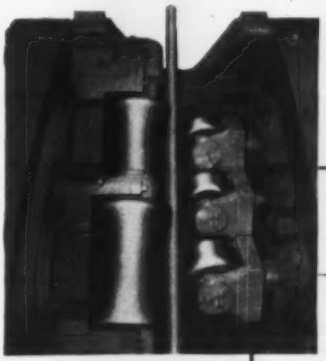
American Pulley Co., Philadelphia, purchased from Standard Pressed Steel Co., Jenkintown, Pa., the rights, tooling, equipment and inventory for its pressed-steel platform trucks. American Pulley, maker of pressed-steel, two-wheel hand trucks, barrel cradles and industrial wheels, acquired in May Safeway Industrial Equipment Corp., Chicago, producer of manually and electrically operated hydraulic lift trucks. By adding platform trucks to its Materials-Handling Division, American Pul-

(*Please turn to page* 120)

HIGH SPEED SUTTON 5-Roll STRAIGHTENERS



Steady dependable production at high speeds to 1000 feet per minute. Because only one roll of each pair of cross rolls is driven, wear is reduced and roll life lengthened.



- DEPENDABLE SERVICE
- HIGH PRODUCTION
- QUALITY STRAIGHTENING

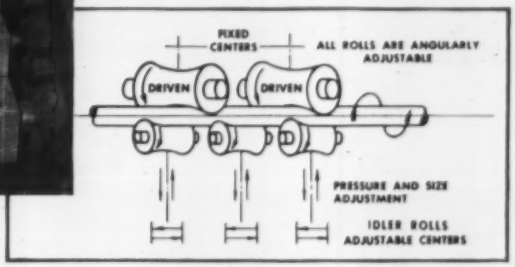


Photo and diagram of 5-roll design shows engineering principle of driven rolls with opposed idler rolls.

Ask for Bulletin No. 25

SUTTON *Engineering* COMPANY

Manufacturers for Ferrous and Non-Ferrous Metal Industries

STRAIGHTENERS, EXTRUSION PRESSES, HYDRAULIC STRETCHERS, SHEET LEVELERS, CONTOUR CORRECTING MACHINES, STRAIGHTENING PRESSES, ROTARY CLEANERS, HEAVY-DUTY UNIVERSAL JOINTS, ROLLS

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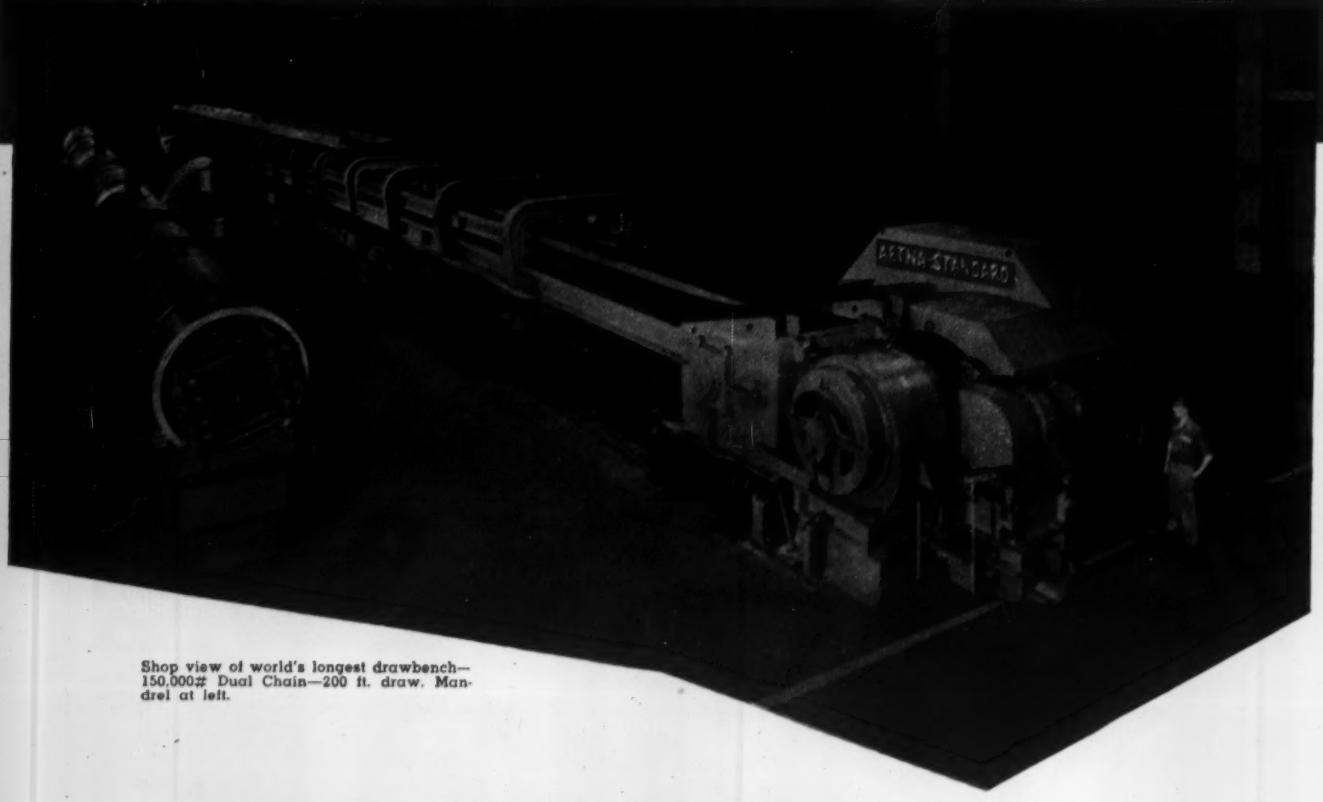
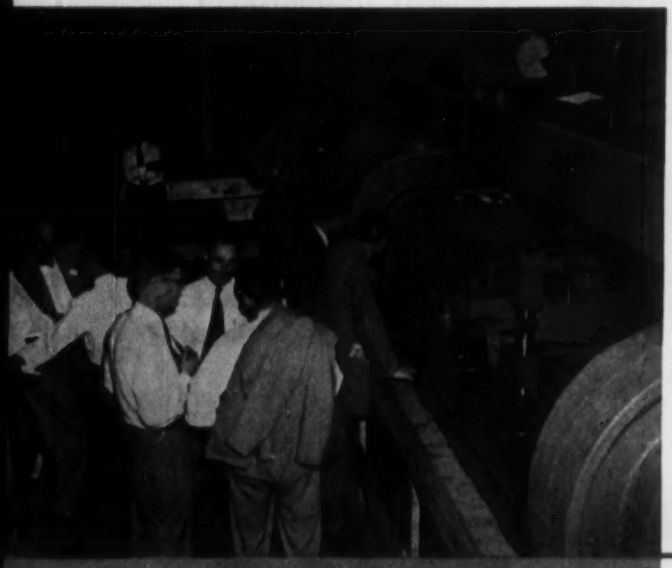
PHONE: GRANT 1-8077 PLANT: BELLEFONTE, PA.

Always Something NEW



Shop view of world's longest drawbench—150,000# Dual Chain—200 ft. draw. Mandrel at left.

WORLD'S LONGEST DRAWBENCH



106 representatives of 37 companies from America and Canada visited Aetna's Ellwood City, Pa., plant to see the demonstration.

200 ft. draw at speeds up to 350 FPM — the world's longest drawbench. This 150,000# Dual Chain, first of its kind and size, can draw five tubes at once at speeds up to 350 FPM. The bench, used primarily for breakdown passes, furnishes long lengths of tubing to the Bull Block (opposite page). Designed and manufactured by Aetna-Standard in cooperation with Chase Brass & Copper Co. The world over, Aetna-Standard is known as "the idea people" and leading manufacturer of Cold Draw Equipment for Tubes and Bars.

(OTHER SPECIFICATIONS)

DRAW SPEEDS: 110—165—220—330 FPM.

MAX. TUBE LENGTH: 150 ft. before draw, 200 ft. after draw.

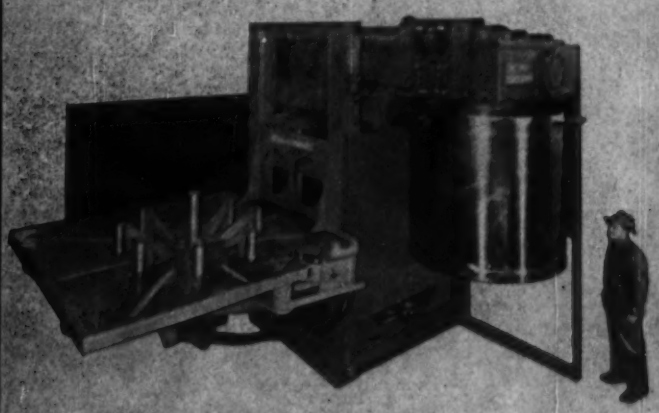
MAX. DIE SIZE: 14" O.D. Single Draw; 6" O.D. Triple Draw and 6" O.D. Five Draw.

LOADING RACK CAPACITY: 100—3" O.D. Tubes.

CARRIAGE AND HOOK: Air Operated.

at Aetna-Standard

. . . the Idea People



Two views of Aetna's new Inverted Bull Block for production of thin wall, smaller diameter copper tubes.

INVERTED BULL BLOCK

The strong demand for thin wall, small diameter copper tubes created a need for a new type and size of Inverted Bull Block. Designed and built by Aetna, the Bull Block has a drum diameter of 60" x 52" working face; drawing speeds of 150 to 2,000 FPM. A typical drawing cycle starts with 1.234" O.D. x .055" wall, finishing in 8 passes to .249" O.D. x .023" wall. Aetna furnished three of these Inverted Bull Blocks for Chase Brass & Copper Co.'s Cleveland, Ohio, plant. Additional equipment included Coil Handling Conveyors; Tube Loading Racks; Pointing and Cutting Auxiliary Equipment. The complete Aetna installation at Chase includes: The world's longest drawbench (described opposite page); one 36,000# Dual Chain Bench, 5-Draw—130 ft. lengths at speeds up to 400 FPM; two 8,000# Single Chain Benches for 50 ft. drawing at two speeds—200 and 400 FPM.

OTHER AETNA PRODUCTS

In each of six equipment categories, Aetna-Standard is known as "the idea people": Continuous Butt Weld Pipe Mills; Seamless Tube Mills; Continuous Galvanizing and Electrolytic Tinning Lines; Finishing Equipment for Sheet and Strip; Cold Drawing; Rubber and Plastic.

THE AETNA-STANDARD ENGINEERING COMPANY · PITTSBURGH, PA.

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PLANTS IN WARREN, OHIO · ELLWOOD CITY, PENNSYLVANIA

16 pages of useful information about

HIGH ALLOY CASTINGS

DURALOY DURASPUN

This is our New General Bulletin—3354G. It's full of information and data on the chrome-iron and chrome-nickel castings so necessary when corrosion, high temperatures and abrasion must be resisted. It will serve as a general selection guide for those specifying or using such castings.

The bulletin also reviews briefly our experience in both static and centrifugal castings, an experience going back to the pioneering days of 1922 and 1933 respectively. It also tells about our facilities for furnishing castings to any desired analysis, welding, X-ray and gamma ray testing, metallurgical and founary control.

WRITE or CALL our nearest office for a copy.
We believe you will find it helpful in your work.

THE DURALOY COMPANY
OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.
CHICAGO OFFICE: 332 South Michigan Avenue

(*Concluded from page* 117)

ley rounds out its line to include all types of manually operated materials handling equipment.

REPRESENTATIVES

Sidney Machine Tool Co., Sidney, O., appointed Ford Machinery Co., Toledo, O., as a distributor of its heavy-duty lathes.

NEW ADDRESSES

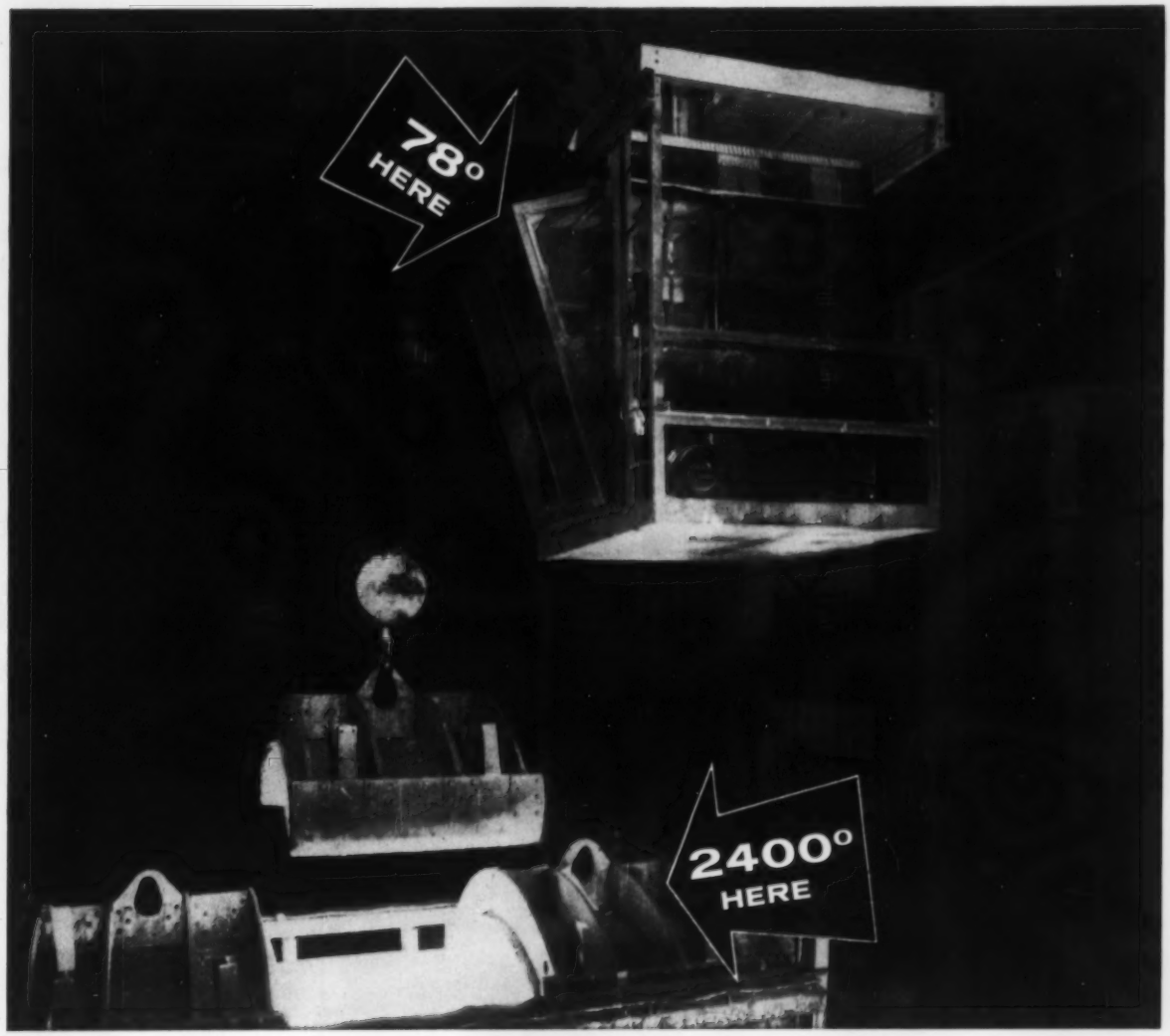
Greer Hydraulics Inc., New York, manufacturer of industrial accumulators and test equipment, moved its Detroit offices to 21329 Woodward Ave., Detroit 20, Mich.

Bailey Meter Co., Cleveland, maker of industrial instruments and automatic controls for power and process industries, moved its district offices to larger quarters: Atlanta office, under managership of M. J. McWhorter, to 1145 Peachtree St.; Dallas office, F. D. Krusemark, manager, to 6615 Snider Plaza; and Memphis office, R. E. Byers, manager, to 3355 Poplar Ave.

ASSOCIATIONS

Plans for memorial rites at the historic Wheeling, W. Va., suspension bridge are under way. They will be in recognition of the contributions of engineering to the United States and the ingenuity of John A. Roebling who redesigned and built the structure. The century-old bridge, still an important east-west link over the Ohio river, will become a national monument. The project is sponsored by the **West Virginia Society of Professional Engineers.**

General Electric Co.'s foundry department, Schenectady, N. Y., and Precision Metalsmiths Inc., Cleveland, have been elected to membership in the **Investment Casting Institute,** Chicago. The institute recently won the **American Trade Association's** award for distinguished service.



Blaw-Knox keeps crane cab temperatures down when furnace heat goes up

When the lid is off this 2400 F furnace for charging, its heat rises to surround the crane cab—making work practically impossible. To avoid the major work problem that such excessive heat creates for many foundries, the Rolls Division foundry of Blaw-Knox installed a Dravo Crane Cab Conditioner.

Like Blaw-Knox, foundry operators everywhere find that Dravo Conditioners are the answer to their overhead crane "hot spot" dust, dirt or fume problems. With Dravo Conditioners, cab temperatures are held at a 75-85 F maximum, while ambients may soar as high as 180 F. In addition to holding cab temperatures to a comfortable, efficient work level, Dravo Conditioners also remove dust, dirt and fumes from air entering the cab and provide year-round ventilation.

DRAVO
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No matter where they're put to work, Dravo Industrial Air Conditioners pay big dividends by providing effective protection from excessive heat, dust, dirt and fumes. We'd like to tell you more about how these efficient, rugged, easy-to-install units can help you. Why not mail the coupon now or phone the nearest Dravo sales office!

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☐ Please send Bulletin 1301A "Crane Cab Conditioners."
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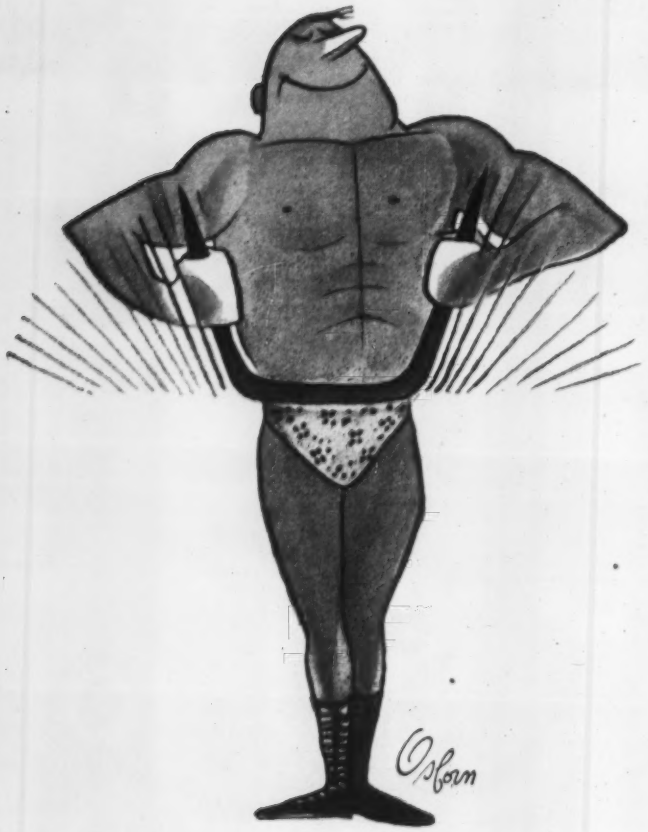

It's a Clinch to Make a Staple

But only Creative Engineering makes it pay

Turning wire into staples is a mighty speedy business. Generally speaking, the faster you make them the less they cost. That's why one staple manufacturer asked us to build a new staple-making machine to their specifications.

Taft-Peirce engineers built a machine for them that automatically takes wire from a roll . . . cuts it to any one of three standard lengths . . . bends it . . . and adds two sharp points. Increases production substantially while it lowers unit costs. Savings paid for this machine in short order.

Creative manufacturing like this is a specialty of Taft-Peirce. Perhaps you can use some of the many services we offer. For more details, send for booklet, "Take It To Taft-Peirce."

We'll Design It . . . Some typical design assists by T-P engineers — a silent typewriter, automobile engine, automatic lens grinders, countless machine-tools and smaller mechanisms.

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TAKE IT TO TAFT-PEIRCE

The Taft-Peirce Manufacturing Company, Woonsocket, R. I.

TELEPHONE: WOONSOCKET 1

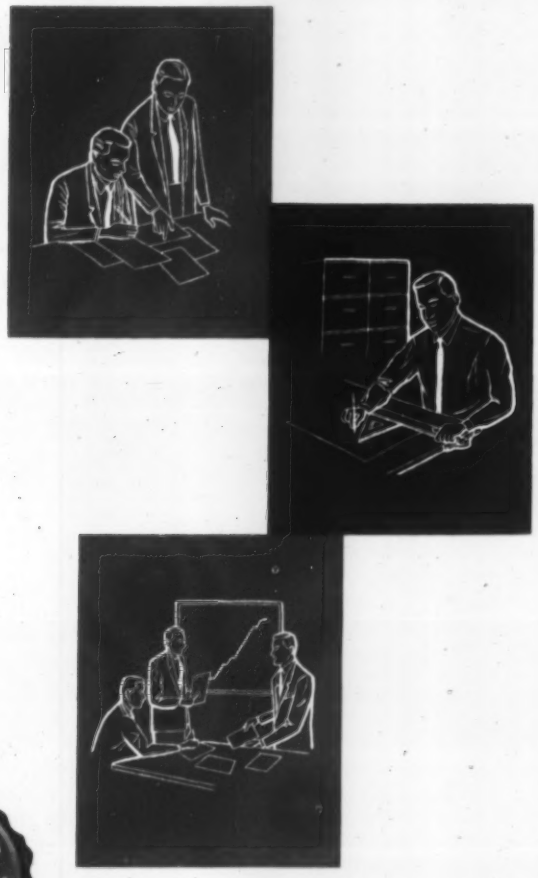
7

STEEL's 1955 Management Series . . .

The editors of STEEL herewith present the seventh in their ten-part series, Program for Management for 1955. The complete list:

1. **Product Communication** (Feb. 14, p. 73)
2. **Cut Costs To Preserve Profits** (Mar. 14, p. 93)
3. **Better Plant Layout** (Apr. 18, p. 93)
4. **Business Communication** (May 16, p. 103)
5. **When To Re-Equip** (June 20, p. 99)
6. **Put Business Trends To Work** (July 18, p. 93)
7. **Business Consultants** (Aug. 15, p. 123)
8. **Purchase Analysis** (Sept. 19)
9. **Market Facts** (Oct. 17)
10. **Keep Your Product Growing** (Nov. 14)

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department, STEEL, Penton Bldg., Cleveland 13, O.*



Business Consultants:
Their uses and limitations

"GOOD COUNSELORS lack no clients," wrote Shakespeare about 450 years ago; today, competent business consultants number among their clients many of the best managed firms in the country.

The recession of last year found the consultant in the spotlight as management went all out to cut costs, strengthen product lines and generally rejuvenate its organization to meet new competitive conditions.

Teamwork — Management has become so complex that few men attempt to run the whole show in a company of any size. Multiple management is the rule. But even the management team can't always cover a business the way it should. Most executives have full-time jobs and can't take time to plan and execute major changes.

"Management often sees the company's weaknesses but doesn't have the staff to do anything about it," points out Robert A. Ward, Ebasco Services Incorporated, New York.

What You Buy

That's where the consultant comes in. A good one offers:

1. Specialized skills and talents.
2. Full-time attention to the problem.
3. Fresh, outside point of view.
4. New ideas.
5. Knowledge of what is helping other firms with similar problems.
6. Short-term employment — there's no obligation to keep him after the job is finished.

"What we're buying is experience, time, recommendations," is the way it's put by W. Clayton Hill, manager, General Administration, Hotpoint Co., Chicago.

Perspective—There's plenty of

Do you need a consultant?

Danger Signals:

- No plans for growth.
- Insufficient profits or excessive costs.
- Declining sales or an unsatisfactory growth rate.
- Rapid increases in selling costs.
- Overburdened executives or supervisors.
- High turnover of personnel.
- Inability to meet delivery schedules.
- Quality complaints.
- Excessive scrap or rework.
- Drastic and unaccountable shifts in product mix.
- Loss of position in big accounts.
- Loss of position of major product lines.
- Excessive, slow-moving or obsolete inventories.
- Unsuitable or crowded space.
- Excessive machine down time.
- Too much paper work.
- Lack of current, usable information on performance and conditions.
- Excessive reliance of operating personnel on committees for decisions.

evidence to show that most consultants deserve the good reputation they have. But, remember, management has got to manage! Consultants are not cure-alls. They can gather facts and make recommendations. Management must decide what action is to be taken. As King McCord, president, Oliver Corp., Chicago, points out: **"Hiring a consultant doesn't mean that management has abdicated."**

Caveat Emptor

That legal maxim—let the buyer beware—is pretty good advice when you shop in the consulting supermarket.

Be careful; get the best available. Poor consulting can only let you "go wrong with confidence."

Quacks — Consultants realize their business is far from perfect. "This isn't a profession, it's a racket," one consultant observed. There's a grain of truth in what he says. Consulting is like any young and fast growing business: A few quacks are willing to take advantage of the unwary. Fortunately, they are in the minority.

Consultants like to compare themselves to lawyers or doctors —business doctors, they're often called. But there are important differences. The glaring one: Consultants have no national setup to police themselves.

Work Ahead—A step in that direction is the Association of Consulting Management Engineers (ACME). Among its objectives: "To foster the development of management consulting as a well recognized profession requiring a high level of professional performance," says Philip Shay, executive secretary.

Much work remains to be done. What seems to be a fair appraisal is this report of Controllership Foundation Inc., New York, to its members:

1. There are many proficient and ethical consulting firms that are not members of ACME.
2. Although ACME's member firms are reputable consulting organizations, membership does not of itself guarantee the client a satisfactory consulting contact.
3. Most of the largest and oldest firms are members of ACME.

People—Consultants have come a long way from the days of the "efficiency expert." But myths linger. A common one: "A consultant is a guy who couldn't get along with people on the management team, so he went out on his own." Isolated cases may bear out the generalization, but better consulting firms fully realize the importance of "human relations."

Says Robert Wise of Booz, Allen & Hamilton, Chicago: "A basic element of consulting is working with people. We do our most successful work where we establish close personal relationships with the client's personnel at all levels. Executive willingness to discuss problems and their solutions freely, contributes substantially to the consulting assignment."

More Teamwork—Some people resent the consultant. "What can an outsider teach me about my business?" They forget: "It's the client's specific knowledge, plus the consultant's broad knowledge and experience, that combine to produce benefits," states F. P. Norman of Lester B. Knight & Associates Inc., Chicago.

Check Your Problem

Some companies call in consultants too often; others, not often enough. What about you? Here's how leading companies decide:

1. What is the problem?
2. How big and how pressing is it?
3. What is the payoff?
4. What will you lose by not solving the problem?

5. Is it within your experience to solve?

6. Can you take the people and time to do it?

7. Will you get new ideas by bringing in a consultant?

8. Could you hire regular employees who could do the job effectively?

9. Is the problem likely to recur?

10. If not, will there be work for the employees you took on to do the job?

11. Can the consultant do the job cheaper than you can?

Define—In general, the bigger the decision, the more important it is to get the best opinion and thinking available. "It's best if management first finds the problem and decides whether it is important enough to warrant hiring a consulting firm to solve it while management tackles its regular job," says J. W. Hannon, Methods Engineering Council, Pittsburgh.

Some problems don't require careful preliminaries. You may, for example, want a check on your own thinking—either when you hope you're right or when you hope you're wrong. When management is divided on the solution to a problem, a consultant may be called in as an impartial third party.

Time Saver—Rockwell Mfg. Co., Pittsburgh, had an order processing and handling system that was outdated. No one had time to devote full attention to the problem. A consultant was hired. Still, the company found that putting in the new system demanded considerable executive time—time that might not have been found except, as one official notes: "The cost of a consultant is a big incentive to find time and get the job over with."

Speaking of costs, remember, you usually get what you pay for. You can expect to pay up to $350 a day, occasionally more, for the services of a partner in a consulting firm; up to about $150 for a senior associate; maybe as low as $50 for a junior. Traveling and living expenses are usually extra.

Where To Find One

When you decide to hire a consultant, how do you find the one

How to choose a consultant:

1. **Before you start shopping know specifically what you want the consultant to do.**

   "Come in and look around, boys" assignments are often disappointing. Don't start to select a firm until everyone in your organization who must approve and work on the project clearly understands the objectives.

2. **Talk to the principals in two or three consulting firms before making a final decision.**

   Be wary if talk concentrates on exploits and results with other clients instead of your problem. If the consultant guarantees to save you a definite amount of money, write him off; this is dangerous ground. You may find it helpful to interview staffmen who would do the work. If you feel they are the kind of men you would like on your team, chances are your organization will feel that way.

3. **Ask for recent references on assignments similar to yours.**

   He may have worked for a number of blue-chip companies on production, personnel or financial problems—and he may have worked for them some time ago—but that's not going to solve your marketing problem. Get the names of a few former clients and call them. Ask what was done about recommendations. Find out what management didn't like about the consultant and what mistakes were made in carrying out the assignment.

4. **Remember, both small and large consulting firms have their place.**

   Some smaller ones specialize in a given industry or function, such as marketing, compensation problems or sales training. The size of a firm is no indication of ability, but you should always satisfy yourself about:

   - Financial standing.
   - Background and experience of its principals and staff members.
   - Caliber of its clients.
   - Amount of repeat business.
   - General reputation.
   - Willingness to refuse a similar assignment for one of your competitors unless cleared in advance with you.

5. **When using a consultant for the first time, consider giving him a limited assignment.**

   Examples: A study of organization, review of compensation or analysis of sales territories. That gives both sides time to get acquainted. For a modest fee you can get an idea of the contribution and level of thinking the consultant offers. That's important. It's easy for the consultant to oversell his services. Some are supersalesmen in consultant's clothing.

6. **Insist that a written proposal be submitted by each consulting firm interviewed.**

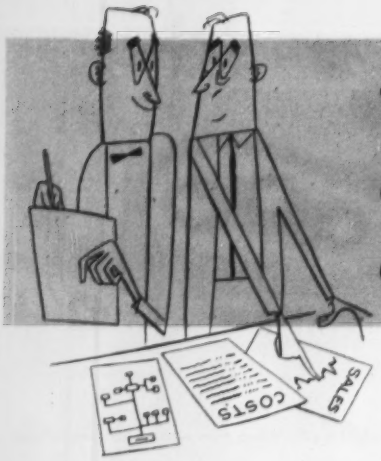
   It should outline:

   - What the work will cover.
   - How it will be done.
   - If a written report is to be submitted.
   - How long it will take; an estimate of cost.
   - How much time the principal will spend on the assignment. (It is annoying and unethical to have him tell you he will supervise on the spot, then do it by remote control.)

7. **Consider the personality and background of the principal who will handle your account.**

   He should be a man you can do battle with verbally at no loss to your admiration and respect for him.

Source: Robert F. Dick, vice president and assistant to the president, Illinois Tool Works, Chicago. Before joining that company in 1950, Mr. Dick was a consultant for 12 years, first with Booz, Fry, Allen & Hamilton; later as vice president of George Fry & Associates.



To help your consultant do a better job

- Realize that the use of a consultant puts extra demands on executive time.
- Enlist the support of your organization: Your people should know why the consultant has been called in, what he's going to do.
- Instruct your organziation to give the consultant full co-operation.
- Have ready material the consultant will want to examine, such as sales figures, cost breakdowns, organization charts.
- See that the consultant meets the key people involved.
- Appoint one or more liaison men from your management team to help the consultant obtain data, arrange meetings, follow progress of work.
- Make sure the consultant knows of any unusual situation within the company that may limit or otherwise affect his recommendations.
- Make a joint periodic review of the proposal letter to be sure you and the consultant are still shooting at the same target.

who is going to do the best job for you? You can get information from:

1. Business friends.
2. Clients of the consultant.
3. Large firms you buy from or sell to.
4. Other consultants.
5. Banks and credit agencies.
6. Your advertising agency, accountants, lawyers, board of directors.
7. Business and trade associations.
8. Visits to the consultants' offices.

Trust—That's only a starter. You've got to find a consultant in whose integrity and ability you have absolute trust. Otherwise, you can't get full value.

"Not keeping the consultant up to date and refusing to treat him as a recognized member of the management team can only result in a poor consulting job," notes Dr. M. J. Day, director of research, Crucible Steel Co. of America, Pittsburgh.

Accomplishment—As Robert F. Dick, vice president, Illinois Tool Works, Chicago, points out: "Admittedly, a fool can hang up a shingle saying 'Management Consultant'—and some do. They do not detract from the constructive and brilliant work being done by hundreds of others. But until this profession becomes more effectively self-policed, it is a responsibility of each of us to expose any shoddy and unethical methods practiced by professional knaves."

That's why it's so important to satisfy yourself, on the basis of personal observation, rather than rely wholly on the experiences of others. You might run into this: A client of one consulting firm recommended its services to every businessman he knew in town. "Not that we're that good," the consultant added frankly, "but because he was satisfied."

Suppose—That particular firm happens to be one that can creditably handle a variety of jobs. But suppose it had been a specialist in marketing. Most likely it couldn't have helped out much on a production question.

The problem of bringing in a consultant is primarily in the hands of top management, because of cost if nothing else. But it's never too early to bring in your key people who will be working with him.

Mistake — Beware of implied criticism! You don't want to be in the position of one firm that decided its work standards needed overhauling.

When the factory manager found out that a consultant had been hired, he took it as lack of faith in his ability. The facts were: No one in the company had time to do the job. Even if there had been, a touchy labor situation made it doubtful that any company-set standards would have been accepted by the union. But no amount of explanation could change the factory manager's first conclusion. He refused to co-operate with the consultants and finally quit his job. The company got its new standards slower and at a higher cost because of the manager's resistance — and lost a crackerjack manager to boot.

Forestall trouble by making your personnel a party to the selection of the consultant. Unless you want to, there's no need to inform everyone. Here's the way it works at Thompson Products Inc., Cleveland: "Most of our employees wouldn't know a consultant if he sat next to them in the cafeteria. But we do make sure that the people he's going to work with know who he is, why he's here, what he's going to do and how they can best co-operate with him."

Sell Your People

"You have to sell the consultants throughout the organization before they start work if you want the most effective job," observes one steel company official. Consultants generally agree. Said one: "If they (management) want us to solve their problem ourselves, we can't do it." "Companies can't afford to pay us to learn what they know," adds another.

Instruct your people up and down the line to talk freely and fully. You're buying the consultant's time and skill, and it hits you right in the wallet pocket if he has to dig up information your people have. This doesn't mean it's time to wash dirty linen. Don't expect the consultant to pass on to you what your employees tell him. A consultant will keep that information as secret as he keeps the details of your business.

Inform—There are other advantages to bringing key personnel below top management into the discussion early. They find out what the problem is, may help define it more clearly. At best, they may come up with a solution. At worst, and this isn't at all bad, they'll know what the company wants from the consultant and will be able to keep him on the track once work gets under way. Be sure they read the proposal letter, so they are sure of the scope of the assignment.

Here are a few more points to keep in mind when the time comes to pick out a consultant:

Consulting firms, though they'd usually have you believe otherwise, are often stronger in some areas than they are in others. To get an idea of how the consultant can handle your problem, talk to clients who have had the *same kind* of work done for them. "Prospective clients have to judge us on our past performance. Unfortunately, unlike an auto salesman, consultants can't take you out for a sample ride," notes Charles R. Stevenson of Stevenson, Jordan & Harrison Inc., New York.

Size Them Up—Make sure the

"**MANAGEMENT** is becoming more sophisticated toward consultants. Thank goodness, top industrial executives are coming here to look us over, to talk with us, to see what facilities we have. Some spend half a day or more. If that had happened a few years ago, I'd have dropped dead," observes Robert Heller, founder and head man at Robert Heller & Associates, Cleveland, one of the largest and most successful consulting firms.

"It used to be considered a disgrace for management to call in a consultant. Today's business is so complex that even the best managements don't have time to do everything—and among our clients are some of the best managed firms in the country.

Overload—"What they are buying is time. Management has an overload of problems brought about by the dynamics of industry and a general shortage of top talent.

"Our job is to assist, not to tell; the only reason for our existence is to help management do what it doesn't have time to do and to provide objectivity," contends Mr. Heller. "What's done with our facts . . . that's up to management."

Critic—Mr. Heller likes to regard his firm as the burr under the saddle of the consulting business. "Part of our work is to take the bunk out," he declares.

"In this business, you've got to break a vicious circle—until you've got big clients you can't support a top caliber staff. And how can you get big clients without having top men? There's no sense at all in any corporation employing a consultant who's not at least as good as its management."

That's one reason Heller employs no temporary people and will handle fewer than a score of jobs in a year. "People have to wait, that's all," Mr. Heller says. The size of the jobs also cuts into the number the firm can handle. One assignment took a dozen men three years; another, eight men, five years.

Experience—The firm probably could be expanded to handle many more jobs, but it's choosy about whom it hires. "Management expects experienced people. If we didn't send them, we would get thrown out on our ears," is the way Mr. Heller puts it. That's one of the reasons all the firm's consultants are senior members. Mr. Heller estimates 100 job applicants are interviewed for each one accepted.

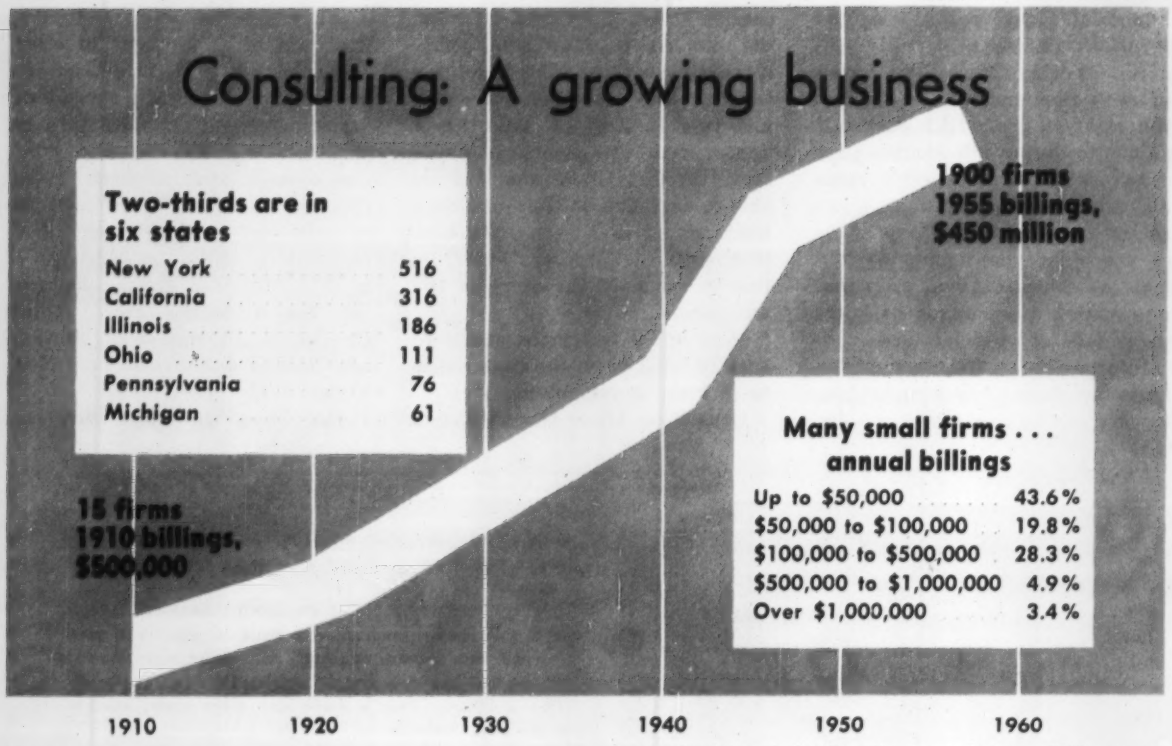
The Heller organization claims its staff has a service average of about nine years (not counting Mr. Heller, who has been in the consulting business almost 30). One reason is Mr. Heller's belief that, "you've got to have happy people or you haven't anything." Heller consultants, exceptionally well paid, generally are assured they'll spend weekends at home, though they may be working hundreds of miles from Cleveland, the home base. If a job is thousands of miles away, the men and their families are moved to location and operations set up on the client's premises—a practical idea that's popular with both sides.

GHQ—Heller & Associates maintains no offices outside Cleveland. That way, "clients may be sure they are dealing with headquarters and that their work is under top-flight direction." Mr. Heller adds: "It has taken 30 years to build this organization to 60 men, plus a top research organization to back them up. How could those facilities possibly be duplicated at six other places around the country without a different quality of work?"

Another reason: It cuts down overhead, allows more of the clients' money to be spent productively, says Mr. Heller.

Prechecked—One of the basic precepts of the firm is group engineering; no opinions are reached and no recommendations are made to a client unless everyone assigned to the job takes part in the decision. Before recommendations are presented to top management, they are prechecked with the people who have to make them work. "Our operation is a joint effort," Mr. Heller points out; "at the outside, 60 per cent Heller, 40 per cent client—one of the reasons our work endures."

A second reason, another consultant points out: "Bob Heller is quite a salesman."



Sources: Association of Consulting Management Engineers; STEEL estimates

consulting firm has the depth of personnel to do the job the way you want it done. Meet as many of the men who will work on the assignment as you can. The Controllership Foundation Inc., New York, recommends this check on the man who will do your work:

1. Is he technically competent for the problem?
2. Will he work well with your organization?
3. Can he gain the respect and active co-operation of your organization?
4. Will he keep his eye on the job at hand?
5. Will he work with your organization rather than put your people to work for him?
6. Is he the kind of a man you'd like to have on your payroll?

Get on Target

Before the consultant starts you may want to have one more meeting to make sure you and he are aiming at the same target. "It's extremely important that the job be clearly established," says Archer W. Richards, Designers for Industry, Cleveland. If the goal changes or the problem is redefined during the assignment, "make it a matter of record rather than memory," he recommends.

Liaison—To help the consultant, you should appoint one or more liaison men to work full time with him. They should know people personally, understand the workings of the organization and be up to date on the capabilities and limitations of your people and equipment.

In the beginning, liaison men help the consultant find his way around, meet people; they learn the work as it progresses. When putting the consultant's recommendations into operation, you have follow-through by people who know the reasoning behind them, and, if the consultant has done a thorough job, they can train needed personnel.

Building—Most consultants take special pains to make sure company personnel are ready to take over. "Our goal is to build the client's personnel to successfully carry on after we leave," says Harvey M. Ferguson, Dyer Engineers Inc., Cleveland.

Don't sell the job of your liaison people short; on given occasions they can make or break a consulting assignment. In general, the more weight they swing around your organization, the better—it amounts to enough authority to carry the consultant over any snags he runs into early in his work.

How's He Doing

"It's a good idea to get together with the consultant occasionally for a joint review of the proposal letter. It gives the consultant a chance to talk over his progress if he's so inclined; but don't force him for an opinion before he's ready.

A review also is a good chance to see how the consultant is doing, to see if your choice was sound. Mr. Dick recommends these checks:

1. Did he start on schedule?
2. Did he bring the staffmen committed to the assignment?
3. Does the partner work into the assignment or does he show up only occasionally?
4. Is the consultant businesslike in handling interviews and conferences with your personnel?

5. Does he seem to be following a plan or is he obviously floundering?

6. Is he a conclusion jumper? Does he criticize your people, policies, methods and procedures after superficial observation?

7. Is he unnecessarily throwing his weight around, upsetting your organization or playing the part of a saint? If that's happening, invite the man to leave and write off your mistake.

Reports—Something to be settled before the assignment starts is the kind of report you can expect. Get together with the consultant on these points:

1. Who's going to read the report? The board of directors, sales manager or production people? It'll probably make a difference in language, presentation, content.

2. What purpose is it going to serve? Will it be a "how to do it" or "why it was done" job?

3. Who is going to put the report into operation? It obviously will have to be in more detail if management is going to do it than if the consultant is going to handle it.

4. What form will be best? Some consultants like to present findings in a visual presentation, plus a short written summary. Long, detailed reports are on the way out.

Action—Now comes the important question: What are you going to do with the report?

"The best consulting in the world isn't worth a damn unless management uses it," one executive emphasizes. Many cases of "Yeah, we've had consultants, but they never did us any good," can be traced to unused reports stashed away in the files, never acted upon by management.

Try As You Go

Where it can be done, better management consultants try to get recommendations put into effect as soon as they are made, before the study is complete. The practice has triple-barreled benefits.

It aids the consultant in his relations with employees. When they see he's not a hatchet man and that his work has direct value, they often view his activities in a new light. It also gives him an idea of how he's progressing. If recommendations aren't readily accepted, it's a pretty good sign something's wrong, and he can correct it easier than if the assignment were finished.

Management's benefits: You can see how the recommendations work out, whether they are improving your organization or disrupting it and what your employees' reaction is. If workers start calling it "our system," you can be pretty sure the assignment is coming along O.K. If it's "that consultant's system," it's a good bet it won't last long after he leaves.

Habit—Another plus from putting recommendations into effect as they are made is that it gets your management people in the habit of evaluating and acting on the consultant's findings. When he leaves, it should be a relative-

Who uses consultants?

One consulting firm took on these clients over a span of two months:

Forge and Steel Plant: Study of operations, facilities and organization, including review of present and potential markets, product diversification, etc.

Machine Tool Builder: Study of organization and operations, including review of industrial relations.

Steamship Line: Economic analysis of trends and requirements in intercoastal shipping.

Metal Products Manufacturer: Review of operations, markets, operating and distribution costs of zipper manufacturing division.

Telephone Company: Assistance on financial matters.

Organ Manufacturer: Brief study on capacity for expanding production, available markets, etc.

Mining Firm: Design review of a prestressed concrete storage building.

Electric Utility: Space planning, engineering and construction management of a general office building.

Pulp Products Manufacturer: Preliminary study on proposed new bleached sulphate pulp and board mill.

Aluminum Fabricator: Preliminary study of management controls and mechanical devices required in executive offices.

Glass Manufacturer: Survey of water system, including usage and chemical treatment for a glass fiber manufacturing plant.

Metal Products Company: Study of organization, including review of office procedures, personnel, functions and job descriptions.

Natural Gas Company: The feasibility of electronic data processing.

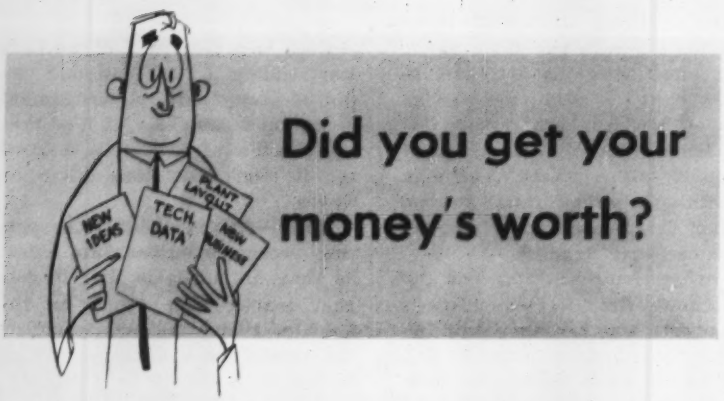
Meat Packer: Production planning and scheduling for more effective use of production facilities, warehouses and inventory control.

Food Processor: Study of clerical work procedures at main offices, including review of office procedures, personnel, functions and job descriptions.

Pulp Products Manufacturer: Appraisal of construction of paper mill.

Silk Products Company: Appraisal of water supply system for mill.

Street Railway: Appraisal of properties.



Did you get your money's worth?

The value of a consulting job sometimes can be measured directly in dollar savings. Often it can't. Try evaluating this way:

- Were the recommendations usable, specific, applicable to the company and economical to execute?
- Are the consultant's recommendations still in effect and useful after a reasonable lapse of time?
- Is the consultant willing and able to implement his counsel?
- Was the assignment carried out with a minimum of disruption in the organization?
- Did members of the organization learn and grow through their contact with the consultant?
- Did the company receive new ideas from the contact?
- Does the organization have confidence in the technical competence of the consultant?
- Is the organization willing to live with the consultant's recommendations?
- Was the job done within original time and cost estimates?

Source: Controllership Foundation Inc

ly easy task to finish up the final recommendations.

That doesn't mean all recommendations are going to be put into effect as soon as they are made. Some may be delayed because of considerations beyond the scope of the consultant's study; others may never be used because management isn't convinced they are in the company's best interest. Remember, management must manage; the consultant's job is to advise and inform, so intelligent, soundly based decisions may be made.

New Product—Take the case of Hotpoint Co. After the Korean War, the company had a jet engine plant it wanted to convert to production of refrigerators.

But Hotpoint had to make changes in organization. It had men who could have done it, but they weren't free to give full-time attention—and Hotpoint wanted speed. It called in three consulting firms and talked over the project. Hotpoint asked the consultants to submit a general outline of the way they'd go about solving the problem, how long it would take and the cost.

Selection—Proposals were evaluated like this: How clearly had the consultant framed the objective? How was he going to achieve it? How much time would it take? How much would it cost? A consultant was chosen and put to work. Weekly progress reports were submitted; about once a month the consultant went over the work with the president.

After three months, a preliminary report was submitted. Basically it contained: Here's what we saw; here's what looks like answers. Top management went over the report, made some changes as suggested, turned down some and deferred others because the timing wasn't acceptable.

"Sure it cost us money," said one official, "but it was well worth it."

Was It Worth-While?

That feeling of "well worth it" is sometimes hard to get. It's true that on many consulting jobs the results can be measured directly in dollars. One company called in a consultant to check over its insurance coverage and wound up with broader coverage than before, plus a direct cash saving of $38,000 a year.

Don't overlook this: Sometimes consultants may not find the answer and still be well worth the fee—they may find the answer to the answer. One of the major builders of computing machines had some of its best men working on one problem for three years. Finally the project head, one of the company's best engineers, announced he was giving up. The work was turned over to a consultant who went over the company's extensive work, found 12 additional ways of attacking the problem—but still no satisfactory solution.

Reviewing the consultant's work, the company's engineer took new interest in the problem and eventually solved it. The company says: "If it hadn't been for the consultant, we'd still be without that answer."

Success—For assignments that don't produce such tangible results, try the checklist on this page. Or you can do it the way an engineering consultant who is hiring a consultant (for personnel studies) says he will: "I'll judge his success by how much more I know after he has gone."

You'll have a better chance to come out on that plus side if you follow these steps:

1. Know what you want.
2. Choose your consultant carefully.
3. Get him started on the right track.
4. Give him your full co-operation.
5. Use his recommendations.
6. Allow enough time for them to take effect.

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FAFNIR

BALL BEARINGS

MOST COMPLETE LINE IN AMERICA

STEEL

August 15, 1955

Technical Outlook

HIGH PURITY SODIUM—National Distillers Products Corp. will supply sodium for Electro Metallurgical Co.'s 7500-ton-a-year titanium plant which is slated to be in production by mid-1956 (both facilities are in Ashtabula, O.). Because of rigorous specifications, an atmosphere of argon will be used in the refining process to produce a sodium of a purity not previously available commercially.

SLICK AS A WHISTLE—If you can use electricweld tubing that has inside surface finish superior to many honed finishes, Jones and Laughlin Steel Corp. is your source. This cold-drawn tubing is finding cost-saving applications in hydraulic and pressure cylinders of all kinds. It's the cold working that gives the unsurpassed finish and increased tensiles.

EASE WASTE PROBLEMS—State legislation often makes the disposal of chromic acid wastes in anodizing operations a major problem. Enthone Inc., New Haven, Conn., has developed a nonchromic acid material for stripping all types of anodic coatings from aluminum parts and racks. There's nothing in the material to complicate disposal.

CRYSTALS CLEARED—The synthetic quartz crystal program has come along so well that crystals of electronic quality can be sold for general industrial use, says Brush Electronics Co. We are no longer dependent on Brazil for the natural product.

BETTER PRODUCTION—Electrostatic spraying now can be used to put vinyl plastisol coatings on wire baskets, dish drainer racks and other wire goods, reports United Chromium. The work was done with Scientific Electric, Garfield, N. J. Advantages: It's more than twice as fast as dip coating. It does away with plastisol waste due to running. It reduces handling because the operation is conveyorized, and spraying is automatic. It gives a more uniform, better looking coating than dip methods.

TIGHTEN THOSE BOLTS—Preload or residual tension in a tightened bolt means more to assembly strength than bolt strength itself, say Russell, Burdsall & Ward fastener experts. A ½-in. high strength bolt torqued to at least 200 ft lb would produce a stronger assembly than a ⅝-in. bolt torqued to only 100-ft lb. Think of the cost savings.

MACHINABILITY BOOST—Machine tools are getting assists from all sides in the drive toward peak cutting efficiency. Metallurgists are contributing workpiece materials that are less inclined to resist the cutting tool. Most recent is LaSalle Steel Co.'s "fatigue-proof." It's said to be a high-strength, free-machining steel bar that requires no heat treating. You can see it at the Production Engineering Show at Chicago's Navy Pier, Sept. 6-16.

HYDRAULIC FLUID TESTS—Following over a year of Underwriters' tests, Monsanto's synthetic hydraulic fluid, Pydraul F-9, has been given a fire hazard rating of 2-3, "much less flammable" than petroleum oil. Kerosene is rated 30-40, petroleum oil 10-20. The fire resistant fluid has a lubricity equivalent to petroleum oils. It is used in hydraulic equipment operated near heat or other potential ignition sources—in die casting machines and steel mill applications, such as billet handling equipment.

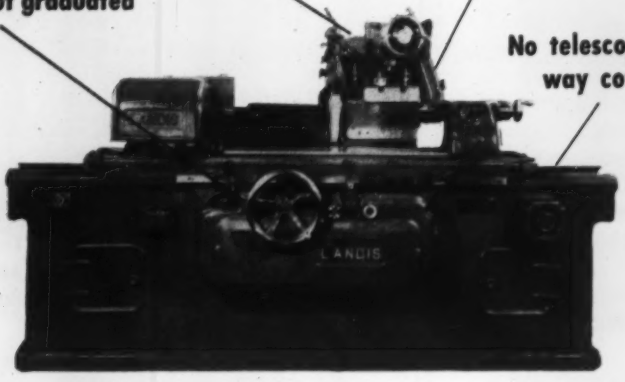
Metalworking Outlook—p. 77 *Market Outlook—p. 185*

MACHINING . . . 1955

Grinding

This is the last in a series of articles on Machining . . . 1955. Others covered turning, milling, forming, drilling and boring and planing and shaping.

• Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department, STEEL, Penton Bldg., Cleveland 13, O.



Pushbutton start and stop only Wt. 5535 lb

1945

RIDING HIGH on the general industry trend toward better surface finishes and closer tolerances, grinding is calling on automation to hold costs down, up product quality.

Standard machines aren't excluded from the treatment. Probably no other machine tool type is ahead of grinding in this respect.

In And Out—Automatic loading and unloading are commonplace. They make nongrind time minimal. A semistandard cylindrical machine grinds 115 piston skirts an hour, removing 0.015 in. of metal. Another rough grinds 450 valve faces an hour. It has an air-operated load-unload system.

A big, often-overlooked advantage of automatic loading and unloading is operator safety. There's no need to reach into the working area.

Costing as little as a couple hundred dollars, these devises can be installed on many standard machines.

Control—Automation has been touted as a boon to the job shop as well as the high-production plant. Nowhere is it truer than in cylindrical grinding.

Automatic control, even to machine adjustment, can be incorporated on a host of otherwise standard machines. Often the control is easily converted from one job to another on the same machine. Cycle and inspection time is cut to a minimum at little sacrifice in setup time.

In Touch—These control systems work through a caliper-type gage that continuously measures the diameter of the workpiece. The reading of this gage is passed through an electrical circuit that controls the wheel feed.

By gaging the workpiece rather than measuring wheel travel or timing the cycle, the gage automatically allows for wheel wear and need not be readjusted after each wheel dressing.

Tolerances of better than 0.0001-in. can be achieved with little trouble. Duplication of precision parts is, of course, another advantage.

Simpler systems stop the cycle after a preset amount of travel, or after a given time.

Double Up—Where several diameters on a single shaft had to be ground, the practice was to do one at a time. Machines were reset or changed for each new diameter.

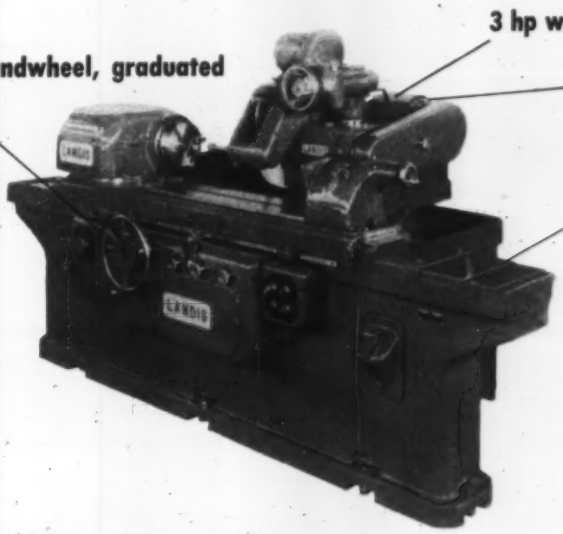
Many new machines are built to take multiple wheels—will grind several diameters in the same cycle. Concentricity is assured. Cycle time is cut by what is essentially the elimination of several operations.

Automatic wheel truing is commonplace. It's often done at no loss in time during the load-unload portion of the cycle.

Abrasive Belts—Great strides in techniques have been made here in the last few years. No longer limited to polishing and buffing, they can be used for metal removal.

Wide varieties of belts and contact wheels make it possible to adapt the belt technique to contours, to remove metal at a high rate or to buff to a high finish.

As a natural step, abrasive belts have taken to automation. Inline transfer, rotary table and trunnion-type handling methods, already established in other machining op-



1955

erations, are working on abrasive belt finishing, particularly in and around Detroit.

Problem—Grinding wheel makers have one big problem: To get uniformity and consistency in the wheels. As the wheel wears, it presents new surfaces at new diameters.

Often with the change in diameter comes a change in cutting conditions. A wheel that cuts properly at the beginning, may wind up doing a poor job. Better manufacturing techniques and better quality control in the wheelmaking process have overcome this fault. Most makers, however, are still working for improvement.

Speed—There has been relatively little change in grinding wheel speeds in the last ten years. Most operations are done with wheel speeds of less than 6400 sfpm. Speeds up to 7800 sfpm are sometimes used. The decision to go to higher speeds, useful in heavy stock removal, may be influenced by plant safety requirements. Most of the new grinding wheels are capable of the higher speeds with practically no risk.

The problem of grinding wheel wear is getting an assist from machine builders. They are incorporating machine controls that give constant periphery surface speed rather than constant rpm.

As the wheel wears and is dressed to reduced diameters, the cutting speed remains constant—optimum cutting conditions are maintained through the life of the wheel. It adds to wheel life and performance and reduces wheel truing requirements.

Feeds—The important change in grinding feeds has been the addition of positive feed control. Recommended feed rates are unchanged, but by making the feed positive and automatic, the machine builders have enhanced both wheel life and performance.

New machines have a wider range of feeds. Since almost every other grinding variable affects the choice of feed, the wider ranges make it possible to get optimum conditions on every job.

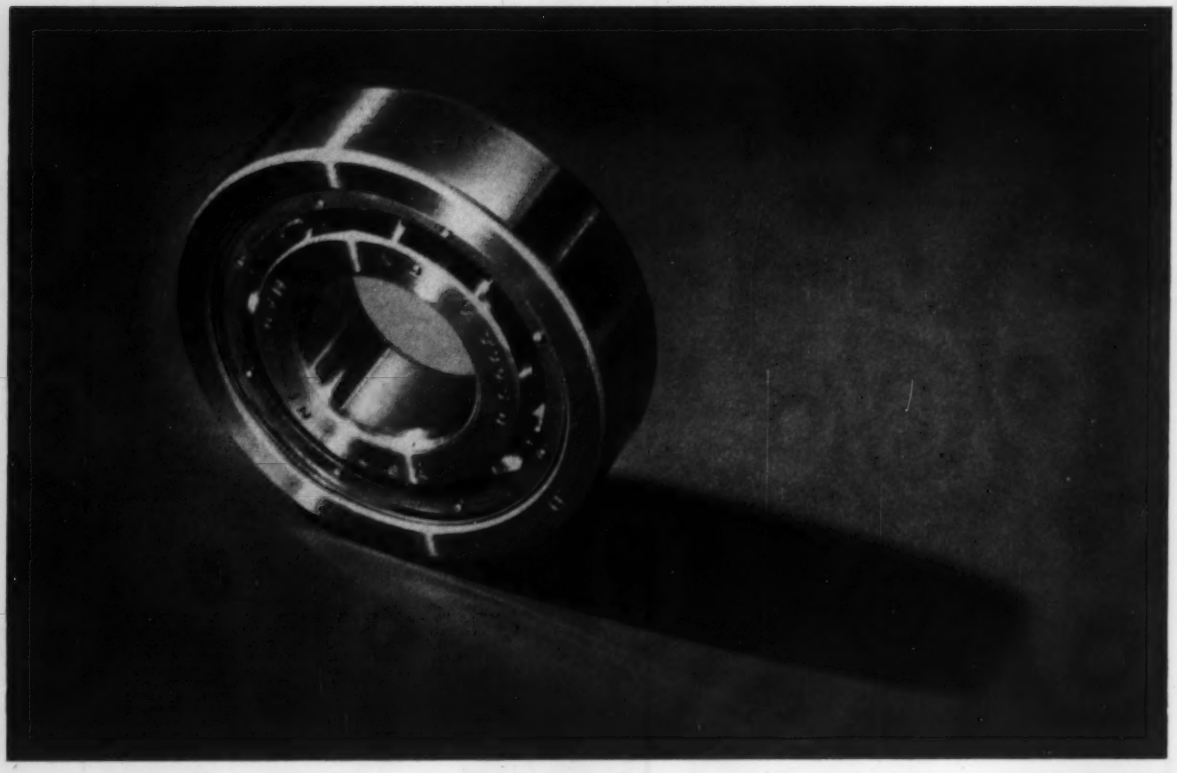
Abrasives—Silicon carbide and aluminum oxide still are the most prevalent wheel types. Several wheelmakers are looking for a new abrasive that will be tougher, will increase wheel life and perhaps handle the tougher metals.

Honing and Lapping—Linked to grinding only as second cousins, these operations are experiencing the same trends. Equipment for both honing and lapping are in the thick of automation.

Many machine tool users must make parts with tolerances in the millionths of an inch. It can't be done by hand on a production basis, so automation takes over.

Honing machines automatically finish the part to size. The abrasive stones feed out to compensate for stone wear. Fixturing, rotary index tables, etc., make it possible to hone several parts at once.

Lapping of flat parts almost always is automatic. The operator may put pieces in one station and take them out of another, but the lapping itself is done without his help. The whole process can be automated by adding simple load and unload systems.



Vacuum Steel: Boost to Bearings

Inclusions in ball bearing tool steels are a thing of the past when steels are melted under vacuum. Early bearing failures are virtually eliminated

By LELAND D. COBB
Manager, Research and Development
New Departure Division
General Motors Corp.

BEARING LIFE depends a lot on freedom of ball and ring materials from inclusions and large carbide formations. Builders of antifriction bearings have long been aware of this.

In general, standard 52100 bearing steels having excessive inclusions result in poor average bearing life; steels having an average number of inclusions allow bearing life as published in catalogs.

Steels classed as exceptionally clean and free of inclusions provide a bearing life 100 to 200 per cent better than handbook ratings.

Clean Steel—Even in acceptable ingots of electric furnace steel, the size and number of inclusions will vary considerably in different sections. The cleaner portions allow greater bearing life than less clean areas. For this reason, ball bearing manufacturers check inclusion number and size in original ingot form. They also inspect individual bars, tubes and wire after rolling and forming.

Just why inclusions are so detrimental to bearing life is not known. Although electric furnace steel fairly free of inclusions has been obtained in isolated cases, vacuum melting is the most consistent method.

Vacuum Only—It appears that tool steels of a quality desired for bearings operating at high temperature can be made consistently only by the vacuum process. This is illustrated in accompanying photomicrographs, comparing 52100

and tool steel made by conventional methods and vacuum melting. Even with vacuum melting, mill practices for refractory materials must be rigidly enforced or the refractories will contaminate the metal. However, large tonnage of vacuum melted steels for antifriction bearings is feasible, now that costs are coming down.

Tests Confirm—Vacuum melted standard 52100 ball and ring materials have shown test endurance consistently averaging about twice that of like analysis standard electric furnace steel (tested under identical laboratory conditions of heavy overloads at 130°F with oil jet lubrication).

But at 400°F under the same loading and speed, vacuum melted tool steel ball and ring materials of the analysis tested by New Departure (1 vanadium, 0.65 carbon, 5 chrome, 5 molybdenum, balance iron) showed an increase in test life from 150 hours maximum for air melted steel to an average of 1080 hours for vacuum melted steel. Results were on a lot of 40 bearings per test.

This increase is traceable to the elimination of early bearing failures. Under the loading used, expected bearing life for both tool steel and 52100 is assumed identical—323 hours at 130°F.

Smaller — In some cases these new clean steels could result in smaller bearings made of 52100 vacuum melted steels, a step desirable in design. It will justify the possibly higher material cost. Bearing life should be more predictable.

Use of vacuum melted tool steels for bearings should open up tremendous new markets in the electric motor field and others where temperature and efficiency are synonymous.

Currently, lubrication problems limit operation of high speed, heavily loaded bearings of vacuum melted tool steel to about 450 to 500°F. These tool steels are expected to permit operation up to 750°F when suitable lubrication mediums are devised.

Have You Seen These Other Articles on Vacuum Metallurgy in STEEL?

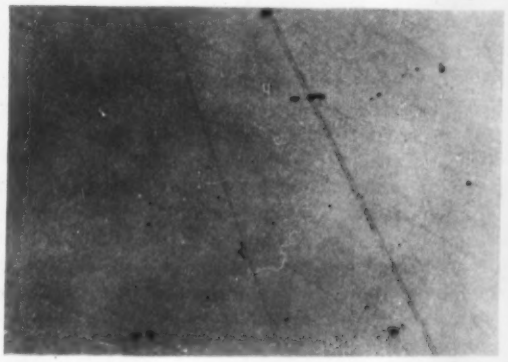
July 4—"New Life for Metals" How Carboloy Department of General Electric Co. is using vacuum melting to improve the mechanical properties of old alloys, produce new strong alloys of lower strategic metal content and develop special purpose alloys with exceptional strength at extreme temperatures.

July 25—"Out of a Vacuum—Tougher Metals" How Utica Drop Forge & Tool Corp. makes jet engine alloys three times more rugged by melting and casting them in a vacuum.

Extra copies of these articles are available in quantities from one to three until supply is exhausted. Write Editorial Department, STEEL, Penton Bldg., Cleveland 13, O.

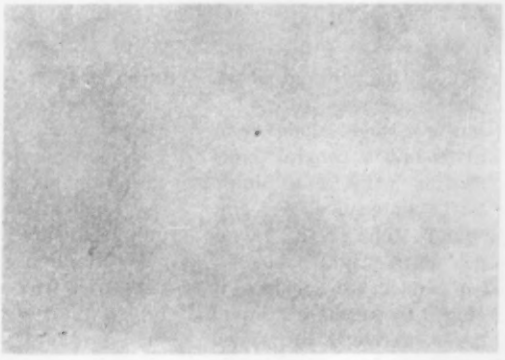
How Vacuum Melting Prevents Inclusions

STANDARD MELT

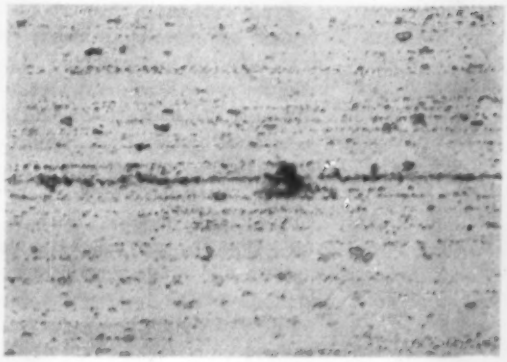


52100 Steel X100

VACUUM MELT

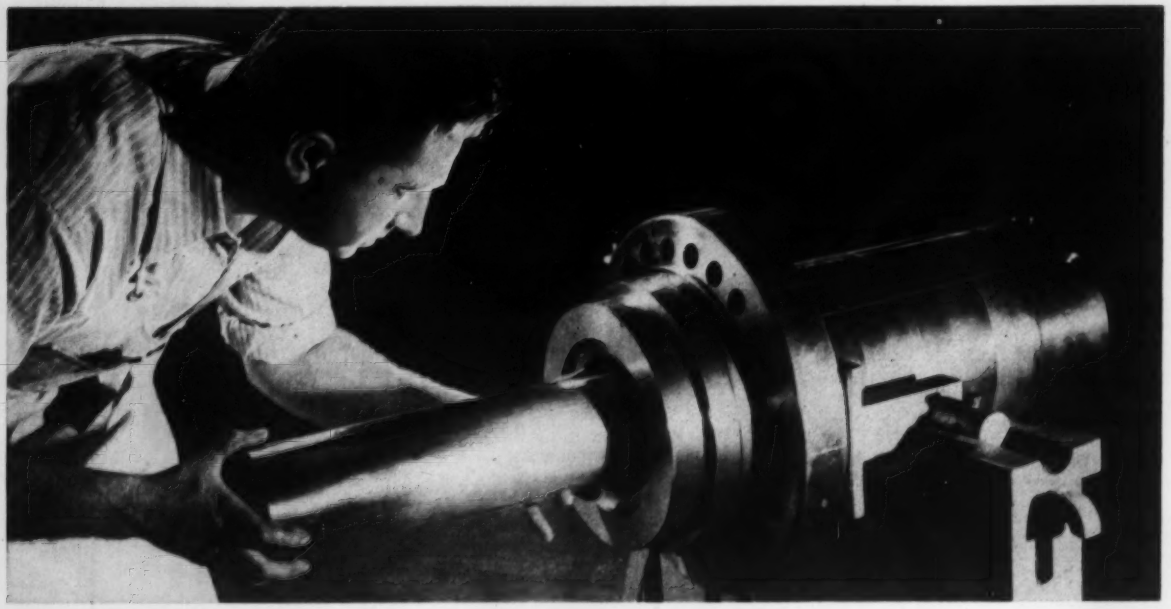


52100 Steel X100



Tool Steel X100

Tool Steel X100



Inconel liner is inserted into the stator to make a can for . . .

The Pump That Started a Business

NEED A PUMP that will run for 10, maybe 20 years, without maintenance and never leak a drop?

You can get one—along with sealed valves and a control panel (using devices without a single moving part) which flashes a signal if a pump stops or the valves aren't open at the right time.

Called a canned motor-pump, it was developed to circulate a liquid coolant in a hermetically sealed system. It's used in a closed hydraulic circuit or loop.

Such loops include the primary coolant system for nuclear reactors. Canned pumps are at work in the atomic submarine *Nautilus*. A 13½-ton one is being built for the first full-scale atomic power plant (to be erected near Shippingport, Pa.) for the generation of electricity.

Range—The new Westinghouse Atomic Equipment Department plant, Cheswick, Pa., can turn out canned motor-pumps that range in capacity from 5 gpm to 17,000 gpm. Each can handle liquids at system pressures up to 2500 psi and temperatures as high as 650°F. Designs are available for liquid metal at system temperatures as high as 1000°F.

Engineers at Cheswick say the canned pump is useful in steam systems where controlled or forced circulation is needed and in process applications in the chemical and petroleum industries.

Westinghouse sees a number of industrial uses for the pump and its auxiliaries—high temperature, high pressure valves and controls—which are being made in its new privately financed atomic parts factory.

The Virginia Electric Power Co. has put into operation the first canned pump to circulate boiler feed water in a closed-loop system. This unit at the Possum Point, Va., generating station circulates 4700 gpm of 605°F water at 1725 psi continuously, taking suction from the steam drum and pumping through the boiler back to the drum.

Salient Points—The zero-leakage feature of the canned motor-pump is of importance in a closed-loop boiler feed water system such as this. There are other advantages, too. Being small and light, the pump is easy to install: Lower it into place and connect two services—cooling water line and alternating-current power.

Instrumentation is minimal—a cooling water flow indicator and a pump bearing thermocouple. Both are connected to light and buzzer circuits.

Advantage Here—Being a hermetically sealed unit, the pump can operate without an injection water bleed. Since there are no external shaft seals, maintenance problems are greatly simplified.

In a nuclear reactor, heat generated by atomic fission is transferred to the pumped fluid. As this radioactive fluid is circulated through the loop, it goes through a heat exchanger then through the canned motor-pump.

The cycle is completed by returning the primary fluid to the reactor. In the primary coolant system for nuclear reactors, zero leakage of the radioactive coolant fluid is a must for safety. The canned pump meets this need.

In a steam system, there's no problem of radioactive leakage. But the canned pump does away

with expensive seals and related maintenance problems.

In operations where volatile and toxic fluids are pumped, advantages are zero leakage and reduced maintenance.

Mother of Invention—Design for the canned pump grew out of the need for a leakproof system for the *Nautilus'* atomic motor. To Westinghouse atomic engineers, the can design looked like the answer.

Westinghouse people say similar, though not so critical, leakage problems arise in some industrial processes, especially in high temperature, high pressure work.

How It's Made—The pump impeller and its electric drive motor are encased within a single pressure tight vessel. This means the fluid being pumped circulates throughout the motor—through its bearings, about its rotor and around its sealed stator.

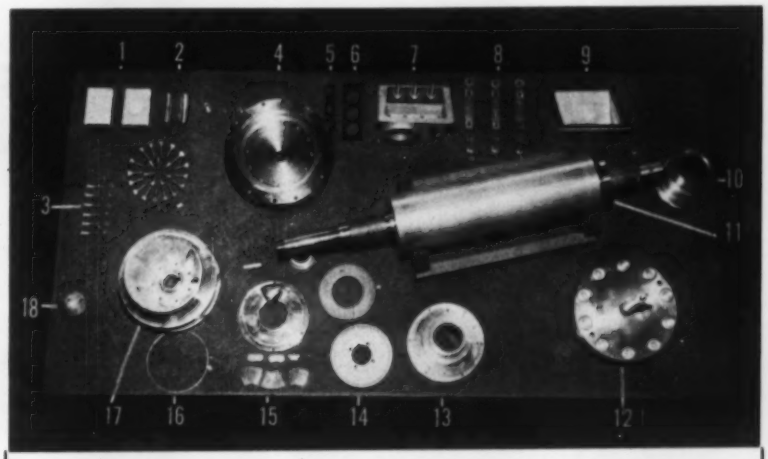
The stator windings are protected from the hot fluid by jacketing the ends and outside diameter in stainless steel and then lining the inner bore with a cylinder or "can" of thin Inconel sheet, welded leak tight at each end. The outer surface of the rotor is canned in the same manner for the same reason.

Auxiliaries—The Cheswick plant soon will be making a line of high-pressure, high-temperature valves for the primary loop of nuclear power systems. All designs are specialized at this stage of the game to meet requirements of handling hot, radioactive coolant with zero leakage.

Valves are two sizes: Large ones for the primary loop; smaller ones for the control of large valves or for use in the smaller lines of the primary system. Types include: Gate, check, capped manual, globe and poppet.

Control—Circuitry based on solid state devices is being pushed for instrumentation. Reason is proved reliability and the dependability of the magnetic amplifier in industrial control systems.

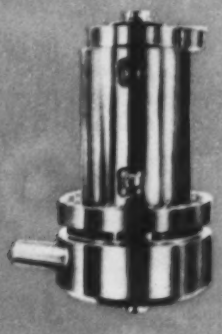
Westinghouse sees a great need for instrumentation in nonnuclear systems. Circuitry is becoming more necessary to compare rates of power flow from two or more systems, to amplify thermocouple currents, to control temperature and pressure.

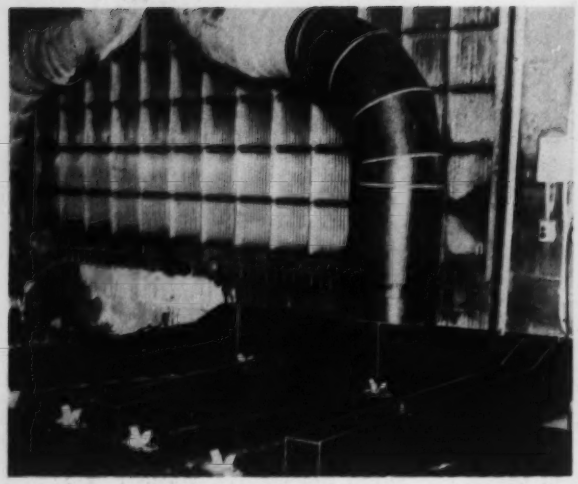


There's a Lot of Metalworking in the Canned Motor-Pump

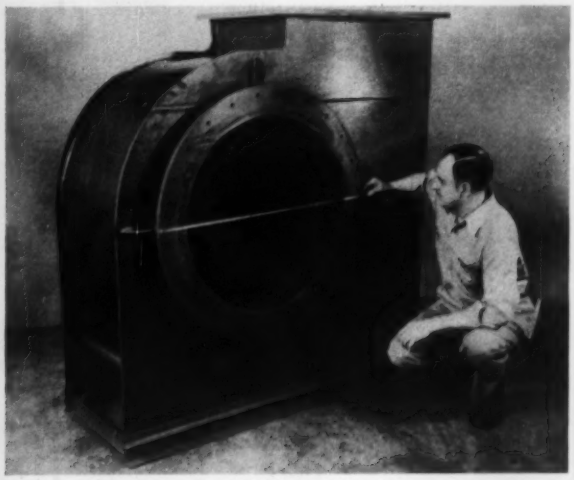
1. **Water jacket**—304 stainless casting
2. **Water cooler cover**—304 bar
3. **Screws**—304 bar
4. **Thermal barrier**—Two 304 forgings welded together leak tight to give dead air space
5. **Terminal block**—Micarta
6. **Terminal gasket**—Neoprene
7. **Terminal box**—Cast aluminum
   Terminal posts—Cupalloy
8. **Shunts**—Braided copper
9. **Terminal box cover**—Aluminum casting
10. **Radial bearing** (pivoted type) — 304 forging with a carbon-graphite (U. S. Graphite Graphitor 14) insert
11. **Rotor**—Shaft is 304 forging. Journals are 17-7PH stainless, nitrided. Outside can (0.20 in. thick) is Inconel, cold rolled annealed and Heliarc welded. Assembly is sized and leak tested
12. **Top can for pump**—304 forging
    Bolts—4140 high strength steel
13. **Radial bearing**—Same as 10
14. Upper—**Thrust bearing disc**—Carbon-graphite type
    Lower—**Thrust bearing runner**—304 forging
15. **Kingsbury-type thrust bearing assembly**
    Top—Complete assembly
    Middle—Links of 304 stainless
    Bottom—Shoes of 17-4 PH stainless, nitrided
16. **O-ring**—316 stainless
17. **Impeller**—304 casting
18. **Impeller nut**—304 bar stock

The canned motor-pump is a hermetically sealed unit for pumping water and other fluids in high-temperature, high-pressure, closed-loop systems. Capacities range from 5 to 17,000 gpm at pressures up to 2500 psi at 650°F. They will handle liquid metals up to 1000°F





Three-section hood and exhaust stack lead into available stainless steel exhaust at Parker Rust-Proof Co. Ducts are of welded construction throughout



This polyvinyl chloride fan was installed at Dow Chemical Corp., Madison, Ill. Operating at 1000 rpm, it delivers 13,500 cfm at a 2-in. static pressure

Plastics Repel Acid Fumes

By DR. J. A. NEUMANN
American Agile Corp.
Maple Heights, O.

HAVING corrosion troubles in exhaust or ventilating ductwork? Plastic systems are doing a job in plants where corrosive fumes and vapors are eating away 24 hours a day.

Fabricated from polyethylene and rigid polyvinyl chloride, these systems are impervious to almost all acids and alkalies. Initial cost is less than stainless steel; life expectancy is eight times longer; and the lighter weight of the plastic makes for easier installation and maintenance.

One Case—At General Electric Co., Cleveland, a stainless steel system for exhausting hydrochloric acid vapors was replaced with a plastic one of identical dimensions.

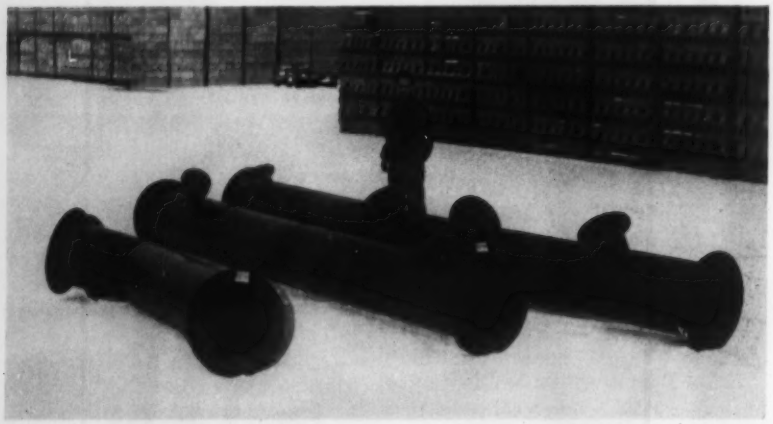
The steel ductwork corroded in 16 months. Weld sections failed; a stainless steel fan eroded, leaving only the hub; and the fan's motor was extensively damaged.

The plastic system has been in five years and is expected to last another five. The plastic fan is still in excellent condition. Another important fact: The steel system was installed at a cost of $2200; the plastic one at a cost of $1950.

Another—At Parker Rust-Proof Co., Detroit, a plastic fabrication replaced a stainless steel stack on a sulphuric acid tank. The original installation, which cost $581, failed after 14 months. The new stack and hood cost $491 and will last 10 years.

Plastics stand up well when used as containers to store or transport acids. Allied Chemical & Dye Corp., New York, switched from 50-lb lead pails with 25-lb capacity to plastic containers. They have equal capacity, but weigh only 10 lb. Since the containers are handled manually, the sharp reduction in weight reduced labor fatigue and eliminated a definite hazard.

Polyvinyl chloride serves well as tank liners in the plating industry. Its rigid construction eliminates stress corrosion.



General Electric Corp. got these plastic exhaust ducts. After installation, they were cut into and more take-offs added as additional tanks were exhausted into the system. GE personnel installed the additional take-offs

REVERE

Extruded Shapes give HUBER 5 GREAT ADVANTAGES

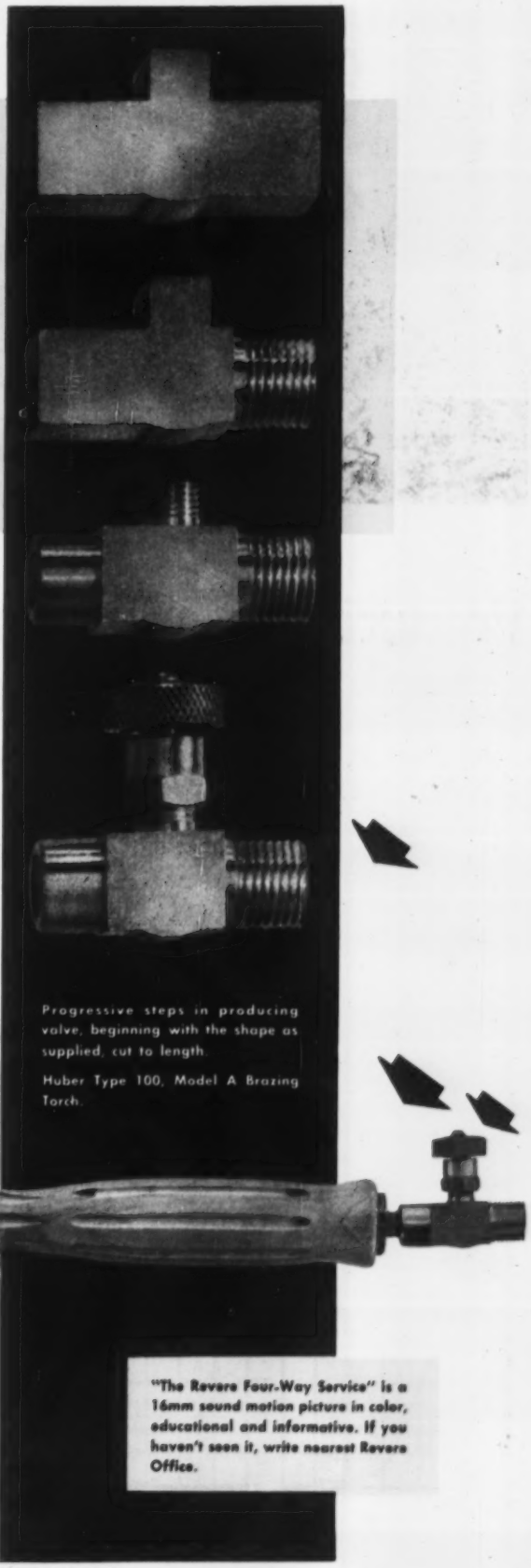
—they can do as much for you

This is the story of a Brazing Torch valve body, made by Huber Industries, Cincinnati 38, Ohio, chiefly out of a brass extruded shape furnished by Revere. As a result of experience Huber has become an outspoken advocate of shapes. Here are the five advantages Huber has found:

1. Machining time reduced 50%.
2. Uniform dimensions mean only one machine set-up for each operation.
3. No rejects whatever. Testing completely eliminated.
4. Uniformity of metal means minimum wear on tools.
5. Buy slugs cut to length, eliminating cutting-off.

The only part of this valve not of brass is the stainless steel conical valve stem.

An extruded shape costs more per pound than standard rod or bar, but the reductions in machining, finishing and other costs much more than make up the difference, and you save money. If you are machining copper and copper-base alloys, or aluminum alloys, get in touch with Revere and learn the advantages of extruded shapes.



Progressive steps in producing valve, beginning with the shape as supplied, cut to length.

Huber Type 100, Model A Brazing Torch.

REVERE

COPPER AND BRASS INCORPORATED

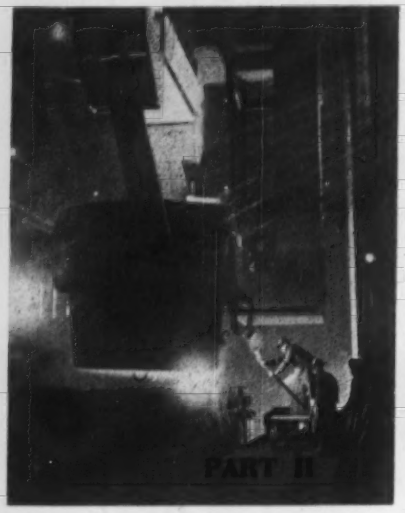
Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

* * *

Mills: Baltimore, Md.; Brooklyn, N. Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

"The Revere Four-Way Service" is a 16mm sound motion picture in color, educational and informative. If you haven't seen it, write nearest Revere Office.



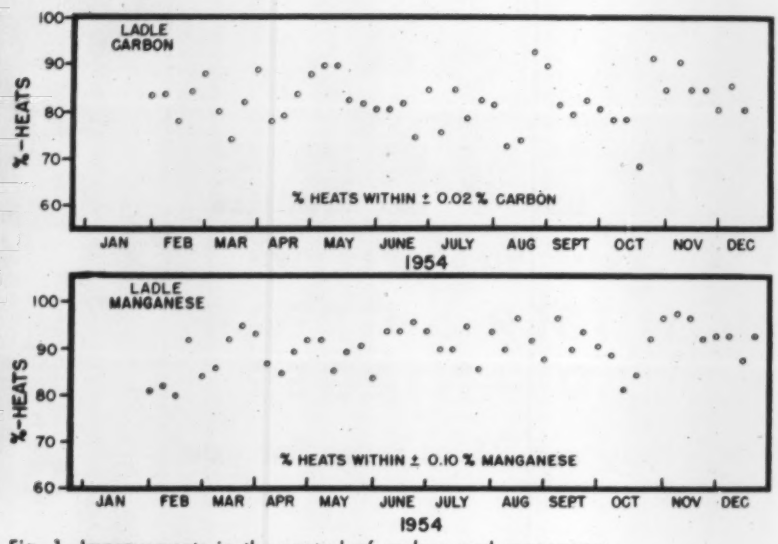

LADLE CARBON
% HEATS WITHIN ± 0.02 % CARBON
% - HEATS
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1954
LADLE MANGANESE
% HEATS WITHIN ± 0.10 % MANGANESE
% - HEATS
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1954

Fig. 1—Improvements in the control of carbon and manganese

Production Control of Quality Steels

Without slighting the fine work of the metallurgical department, quality control succeeds only when operating people understand it and become interested

By R. W. GRAHAM
General Superintendent
Duquesne Works
U. S. Steel Corp.

MANY phases of the quality program are the responsibility of the metallurgical department. Improvements in practice are largely the result of thoughtful analyses of statistical data and field observations by these men. Their efforts are of little value without the enthusiastic co-operation of the operating people who must thoroughly understand the reasons for restrictive requirements.

The steel production problems discussed last week emphasize, among other things, the need for close and accurate control of chemistry. Success means close control of specified elements and minor constituents, some of which are not covered by specifications. Control is no longer a matter of laboratory interest alone. It is a significant part of today's production problem.

Carbon and Manganese — Substantial improvements in the control of these elements in the open-hearth have resulted in the performance record shown by the curve in Fig. 1. Duquesne has not developed anything new in melting partice that will guarantee complete control of all the complex reactions that influence addition efficiency. Improved results can be traced to meticulous adherence to every detail of practice.

Production control responsible for the performances shown has enabled melters to keep the percentage of heats meeting chemical specifications for these two elements at about 96 per cent.

Unusual Problem—Since sulphur adversely affects hot - working characteristics, surface and cleanliness of most steels, it is desirable, even necessary in many in-

SULPHUR

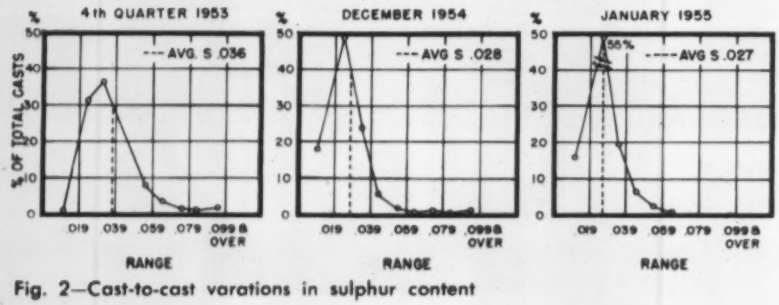


Fig. 2—Cast-to-cast varations in sulphur content

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TEES

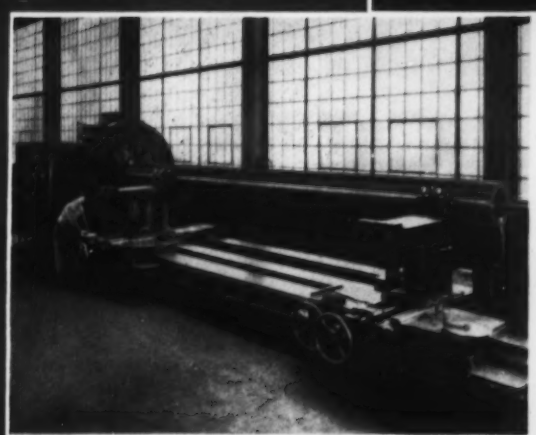
PIPE

VALVE BODIES

LATERALS

CROSSES

ELLS



Chrome Molybdenum Alloy Steel Y's forged, machined, rigidly inspected and tested to comply with customer and code specifications. Mesta Forged Fittings and Pipe provide confident service in High Pressure and High Temperature Piping Systems.

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[illegible] — High Temperature Pipe on a MESTA 100" HEAVY DUTY LATHE in one of the Mesta Machine Shops.

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MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

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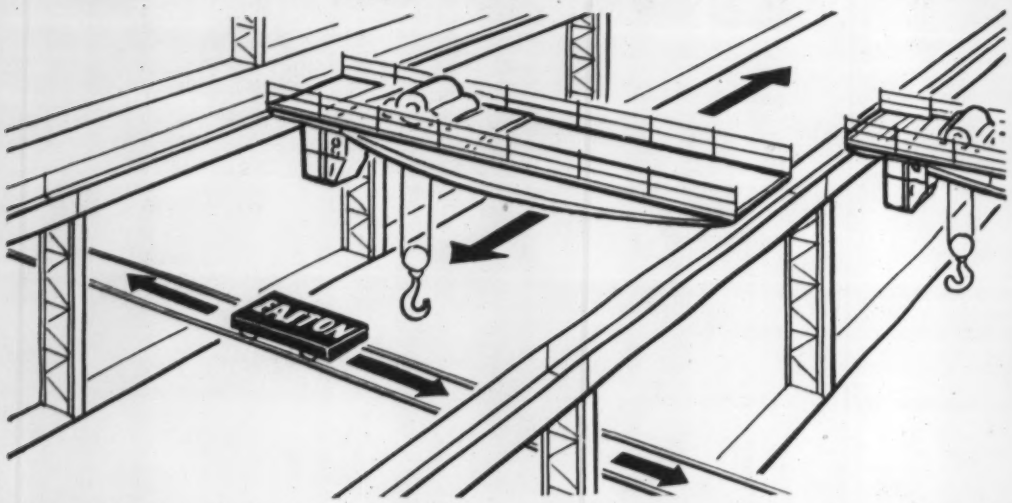
Cross-Bay® Transfer Cars



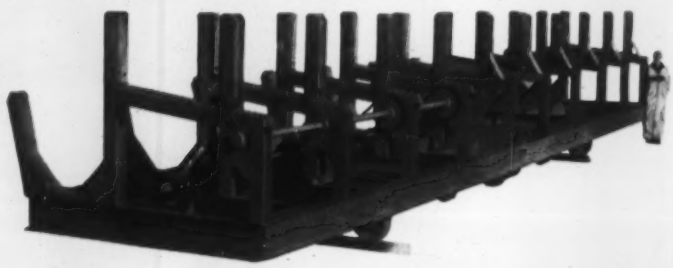
Infinitely variable application of EASTON motor-driven Cross-Bay Cars, together with the possibility of special super-structure design, provides full scope for imaginative planning in this growing era of automatic handling.

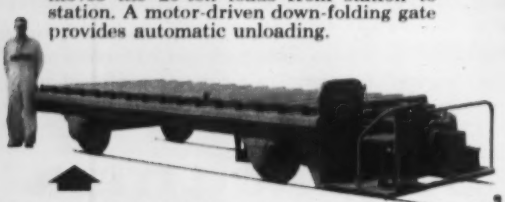
EASTON Cross-Bay Transfer Cars were originally introduced to supplement overhead crane service in modern parallel bay plants and for movement of materials between plant buildings, storage yards and shipping platforms. Operating men everywhere were quick to see the adaptability of the Cross-Bay idea to many other heavy handling and production problems.

EASTON Cross-Bay Cars, controls and special superstructures are custom-designed to meet individual requirements. Customers may specify electric motor, storage battery, gasoline-electric or gasoline-hydraulic power. Controls may be manual, electric (by push-button on the car or remote station) or electronic. EASTON Cross-Bay Cars can be built to capacities from 5 to 500 tons to fit any track gauge.

Investigate the EASTON Cross-Bay idea now for plant expansion and new plant programs.

IN A TUBE MILL. An interesting application of mechanized superstructure. Here several lengths of brass tubing are carried in a special superstructure on an EASTON Cross-Bay Car. The 2 horsepower electro-fluid drive, controlled from a walk-along push-button station on the side of the car, moves the 20-ton loads from station to station. A motor-driven down-folding gate provides automatic unloading.





IN A STEEL WAREHOUSE. Here a 12 horsepower gasoline-hydraulic EASTON Cross-Bay Car handles 25 ton loads of structural shapes in a steel warehouse. A comfortably seated driver operates the car at speeds up to 50 ft. per minute forward or reverse between plant buildings.

IN A STEEL MILL. Here a push-button control panel is attached by a 10 ft. cable to a 100-ton capacity 3 horsepower electro-fluid EASTON Cross-Bay Car. As the operator walks along the car follows carrying two 50 ton slabs of steel.

A-1047

OTHER EASTON CUSTOM-BUILT CARS FOR INDUSTRY

Annealing Furnace Cars	Motor Driven Cars	Scoop Cars
Coal Charging Cars	Newsprint Cars	Skip Cars
Core Oven Cars	Platform Cars	Steel Mill Cars
Gable Bottom Cars	Quarry Cars	Transfer Cars
Hopper Cars	Rack Cars	Transformer Cars
Mine Cars	Rocker Dump Cars	Turntables

FORTY-ONE YEARS OF DEPENDABLE SERVICE IN THE DESIGN AND MANUFACTURE OF INDUSTRIAL TRANSPORTATION EQUIPMENT

EASTON

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

stances, to keep this element at the lowest possible level—Duquesne also produces fairly large tonnages of steel requiring sulphur additions for improved machinability. Practices solve these two widely different objectives by using a standardized melting practice to strive for the lowest possible sulphur levels consistent with sound economics.

Our plant is no different from many others with respect to difficulties with purchased scrap. In 1953 and 1954 we experimented extensively with bundled scrap, melting many 7-ton electric-furnace heats from selected shipments to determine metallic content, alloy contamination and sulphur levels.

Test results, which were released to the American Iron and Steel Institute and to the Scrap Institute, were surprising. They definitely identified many of our melting problems with purchased scrap. While this information was not exactly news to the melt-shop people, the quantitative results have served as a stimulus to the improvement of scrap quality. We believe that there has been an improvement and that programs started by the Scrap Institute will bring about substantial advances.

Sulphur in Hot Metal—Sulphur control includes reasonable selectivity of scrap charged, usage of low-sulphur fuels and usage of iron, which is somewhat unusual in chemistry. Duquesne blast-furnace practice appears to provide a good balance between uniform chemistry and economics. It involves substantial usage of open-hearth slag, with tap and flush slags separated and used separately in the blast-furnace burden.

Slag used like this (in quantities up to 485 lb per ton of iron) appears to have been helpful in removing sulphur. A steady decline in iron sulphur from an average of about 0.040 per cent to about 0.030 per cent was achieved in 1954. It is of interest, from an operating viewpoint, to note that this reduction was done concurrently with reduced usage of coke and limestone.

The curves in Fig. 2 are perhaps even more significant since the melt-shop operator is concerned with cast-to-cast variations rather than averages. Distribution patterns show, for example, that in January, 70 per cent of all casts were under 0.027 sulphur and only 9 per cent were over 0.040 sulphur. The silicon distribution patterns in Fig. 3 are equally significant in the attainment of uniform open-hearth operations.

SILICON

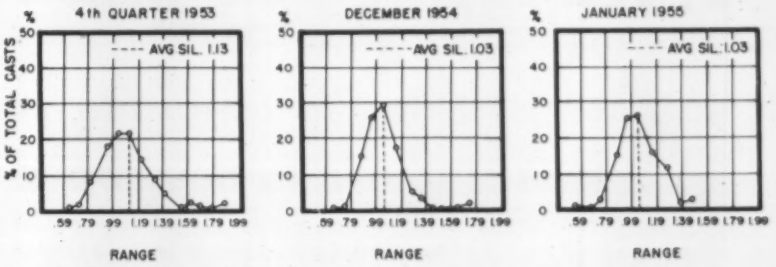


Fig. 3—Cast-to-cast variations in silicon

Manganese and Phosphorus — Continued use of large amounts of open hearth slag in the blast furnace burden has resulted in substantial increases in manganese and phosphorus. Apparently, however, a plant balance for these elements has been reached, and manganese in the iron has leveled off at 2.5 to 3.0 per cent, while phosphorus seems to be stable between 0.280 and 0.300 per cent. The manganese in the iron may be helpful in controlling sulphur in the open-hearth operation, although this conclusion is controversial. In any event, some portion of the manganese is recovered as increased residual manganese in the steel, and corresponding reductions in manganese additions are possible.

Phosphorus is an unavoidable penalty for the use of open-hearth slag. Its presence emphasizes the need for close control of open-hearth slag oxidation and basicity. Open-hearth practice planned around this type iron has been surprisingly successful in producing low-sulphur steels. The low-average sulphur level of 0.022 per cent, with many heats finishing between 0.015 and 0.018 per cent, has been most helpful in reducing conditoning problems and in reducing finished-product rejections.

The practice also has been adequate to cope with the phosphorus problem. Substantial increases in phosphorus content of the iron, as shown in Fig. 4, have had no measurable effect upon phosphorus content or steel produced from it. (Next week—improving the operations.)

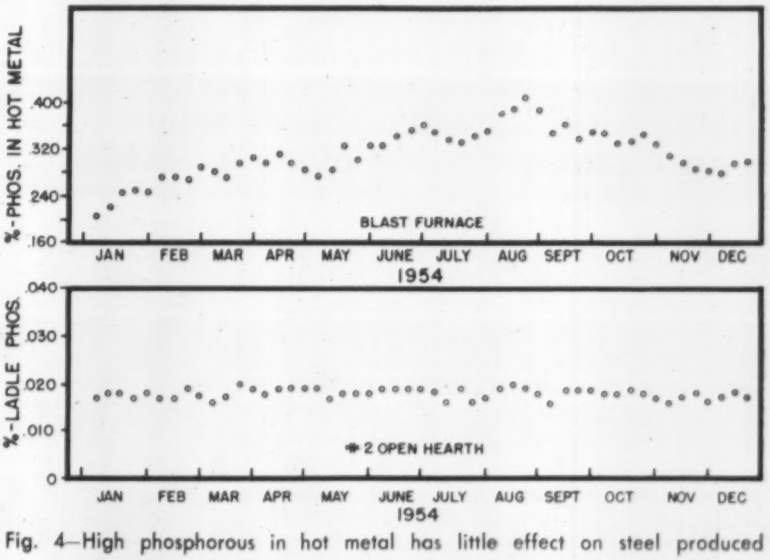

% PHOS. IN HOT METAL
BLAST FURNACE
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1954
% LADLE PHOS.
2 OPEN HEARTH
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1954

Fig. 4—High phosphorous in hot metal has little effect on steel produced

What are You Looking for

If you are planning to up-grade your product by using a Vacuum Furnace to develop or produce superior metals, here are questions you should ask before buying.

Does the Vacuum Furnace have . . .

1 **Hinged door** to conserve floor space . . . assure positive alignment? Provisions for hanging a second door to permit mold set-up work during furnace operation?

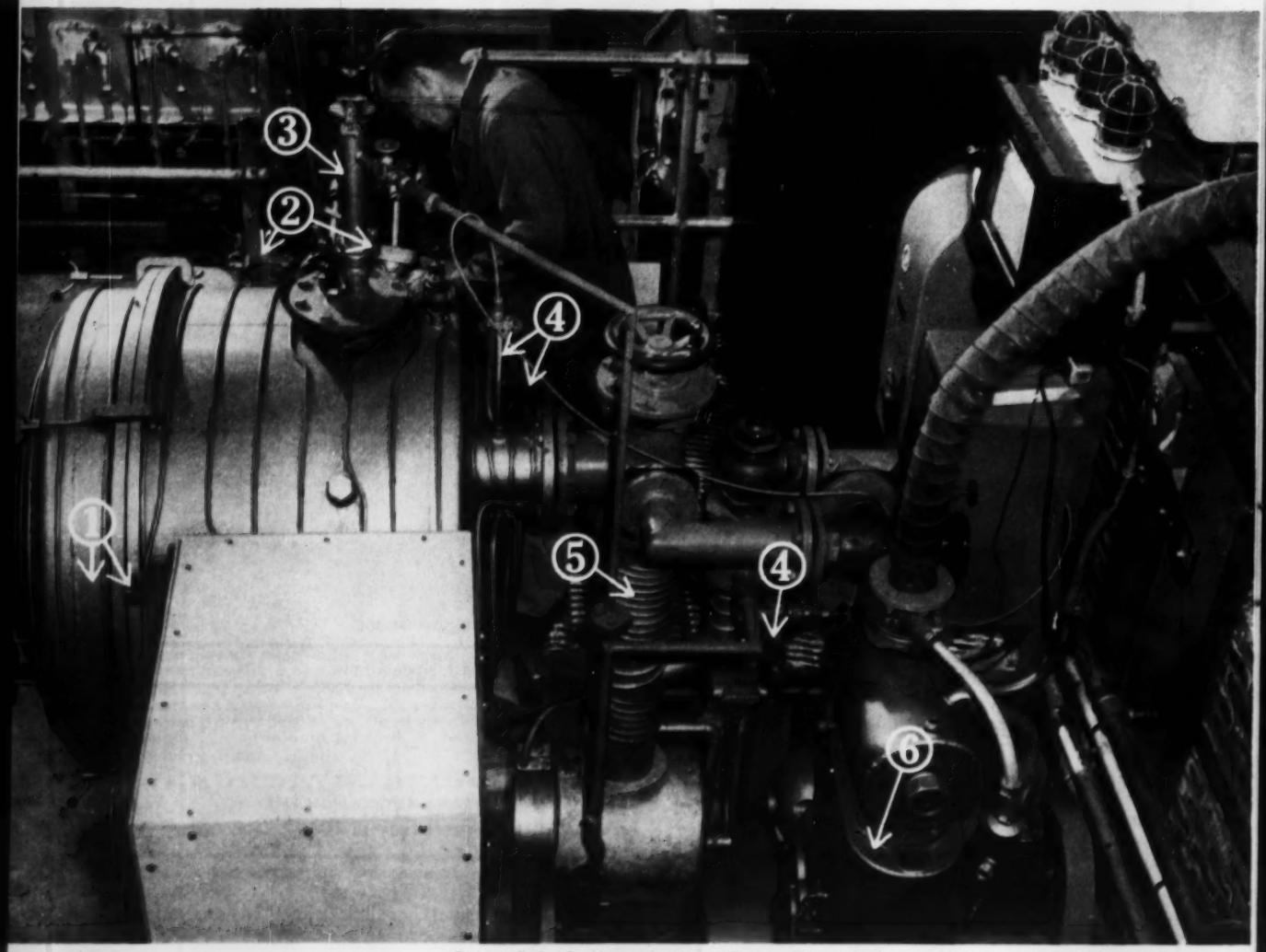
2 **Sight ports** located for ease of operation and equipped with shield and wiper to minimize and remove condensed metallic vapors?

3 **Immersion Thermocouple assembly and air lock** to provide accurate temperature indication for exact process control . . . and to allow retraction and replacement while under vacuum?

4 **Gauging** which resists contamination by condensed vapors from molten bath and provides accurate, reproducible direct reading?

5 High capacity, easy to clean **booster pump** . . . for fast recovery from gas bursts?

6 High capacity **NRC Rotary Gas Ballast Pump** to maintain high efficiency and fast pump down time even on the muggiest days?



First installation for Vacuum Investment Casting. This installation was set up for Austenal Laboratories,

in a Vacuum Furnace?

Vacuum furnaces *can* operate without the features shown below. However, we have learned — from building and operating more high vacuum furnaces than anyone else in the world — that these features more than pay for themselves in terms of safety, flexibility, time, trouble, and money. And these are just some of the special design improvements that NRC engineers can adapt to solve your special problems.

Our years of experience ensure that your NRC Vacuum Furnace will meet your needs as soon as it is installed — and will continue to do so year after year of low cost, trouble-free operation.

Use the coupon below to get your copy of the new NRC Vacuum Furnace catalog *just off the press!*

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7 **Mold turntable** to permit the "split heat" alloy research technique or the casting of several ingots of varied size and shape from a single heat?

8 Conveniently located **controls** that allow one man to operate the furnace from a central position?

9 **Bulk and alloy charging containers** for using full crucible capacity and to allow late alloying additions for precise control?

10 **Coil** fully insulated electrically to eliminate arcing and resulting dangers of explosions from burn-through?

11 Fast, easy **coil disconnect** from coaxial feed-through to provide rapid, simple crucible change?

12 Large diameter, water cooled, **horizontal stainless steel tank,** for maximum accessibility, flexibility and ease of maintenance?

Microcast Division, Dover, New Jersey, for research and development.

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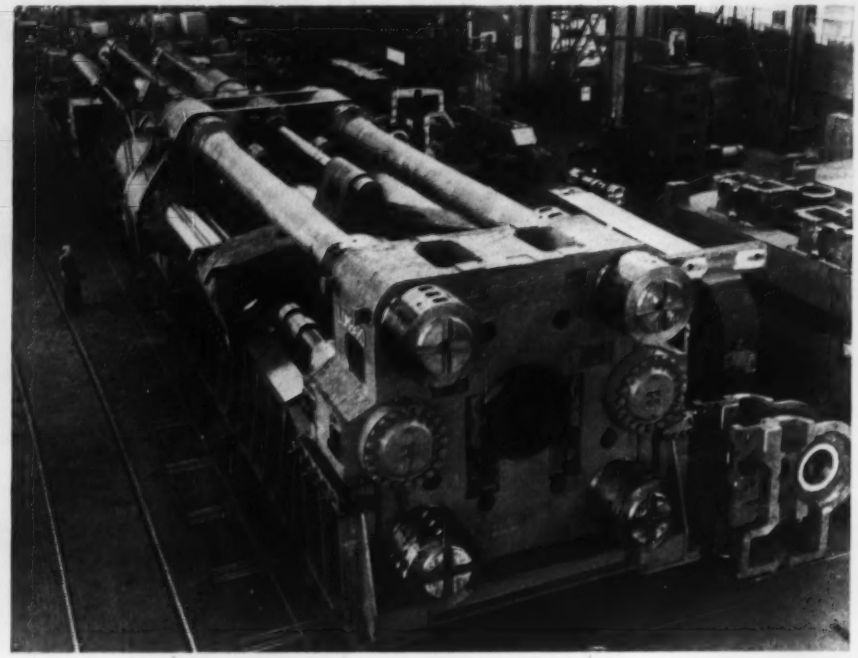


Lombard's 12,000-ton extrusion press, being built for the U. S. Air Force Heavy Press Program, is scheduled for April, 1956, operation. Its capacity makes possible . . .

Bigger and Better Extrusions

TWELVE-THOUSAND TONS of possibilities: That's industry's stake in the extrusion press being built for the Air Force by the Lombard Corp., Youngstown. It will extrude aluminum, titanium and steel.

Now the civilian engineer can start thinking about one-piece designs that have been impossible.

The military will get better aircraft built faster and cheaper.

Its Job—The press will be installed at Harvey Aluminum, Torrance, Calif. Its first job will be to squeeze out one-piece wing spars and aluminum parts for landing gear now made by assembling smaller pieces.

The unit can take billets up to 32 in. in diameter and 70 in. long. It will extrude bars or sections of any size that can be circumscribed within a 32-in. circle.

Its Size—Over-all length of the press and its runout table is 310 ft. Length of the press proper is 126 ft; it is more than 15 ft high. Lombard also built a 1500-ton stretcher to stretch and detwist the extruded shapes.

The 12,000-ton extrusion force is the sum of the machine's pressure components—the main cylinder, the two lateral cylinders and the piercer cylinder. The main cylinder exerts 4500 tons, the lateral cylinders 4500 tons and the piercer 3000 tons. Each component can be used singly or in combination to obtain a variety of tonnages.

Its Control—Most extrusion operations will require four operators, some more. Control will be set up for semiautomatic programming.

Pressure medium is water with soluble oil. Valves are designed with a balancing feature that substantially reduces the effort required for manual operation.

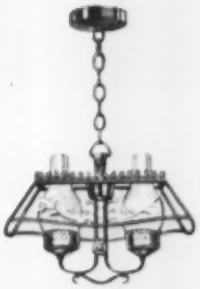
Building Problems—The press was constructed for Lombard by United Engineering & Foundry Co. Facilities of both the New Castle, Pa., and Youngstown plants were required for construction and erection. The two largest steel castings are the platen and main cylinder housing, weighing 200 and 182 tons, respectively. Their casting required four ladles pouring simultaneously.

A special structure, suspended between two railroad cars, will carry one casting at a time to California. Suspended 9 in. above the rails, it will move across country about 12 mph.

Operating Date—All equipment in the accumulative station has been shipped to Harvey. The press will be shipped this fall and is scheduled to go into operation by April, 1956. Lombard hopes to have it set up and under test by February.

The mammoth press has been three years in the engineering and building stages and is estimated to cost over $10 million. Dr. Daniel Lombard, president of Lombard Corp., says: "The press will add tremendously to the nation's defense program and store of industrial knowledge."

If you're eating your heart out over polishing costs---read this!



Skyrocketing enthusiasm of America's homeowners for high-quality solid-brass lighting fixtures created a temporary bottleneck in the polishing room of Globe Lighting Products, Inc., one of the leaders in the field. This production problem coincided with the introduction of Formbrite* to the metal-working industry a couple of years ago.

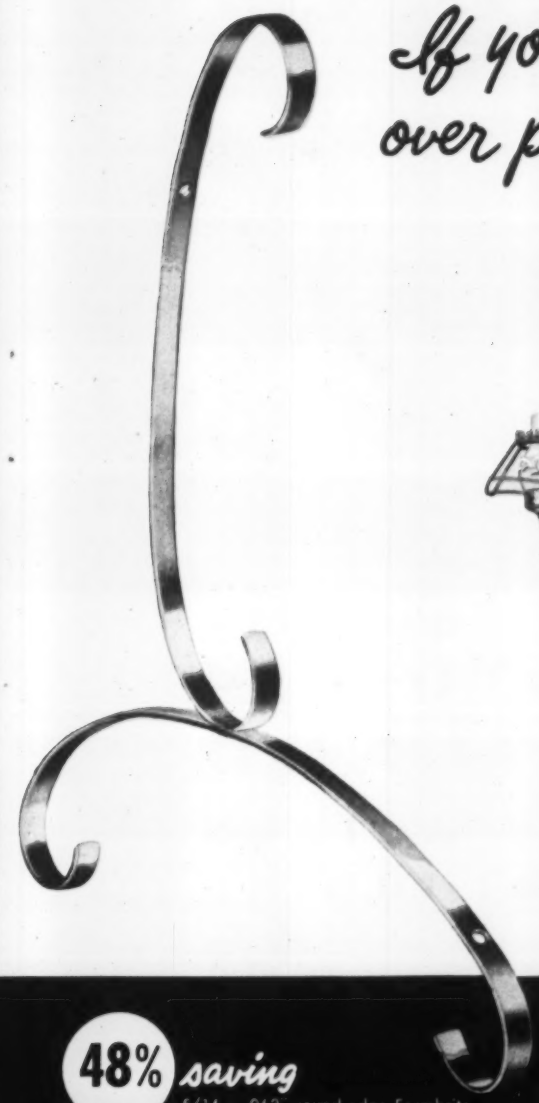
Globe's acceptance of this easy-to-polish fine-grain drawing brass was immediate and enthusiastic. Results were highly successful from the very beginning. Work pile-ups in the polishing room were eliminated and polishing costs were cut in half on many items (see typical examples below). In addition, Globe learned, as have many others, that Formbrite provides a more lustrous finish—is harder, stronger, springier and more scratch-resistant, yet has remarkable ductility for forming and drawing operations.

Surprisingly, Formbrite doesn't cost a penny more than ordinary drawing brass. Why not pass the good news along to those who head up your engineering, design or production departments? Ask them to write for booklet B-39 . . . or phone for a sales representative . . . or request a free sample of Formbrite to try in your own shop. Address: The American Brass Company, General Offices, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

5580

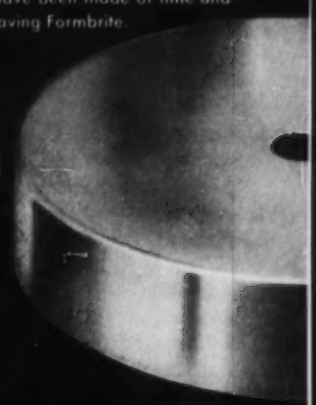
*Reg. U. S. Pat. Off.

Parts illustrated are approximately three-quarters actual size.



48% saving 5/16 x .062" round-edge Formbrite strip in this scroll eliminated a before-bending polishing operation.

26% saving Tens of thousands of these drawn canopies, socket cups, etc., have been made of time-and cost-saving Formbrite.



45% saving After forming, this Formbrite channel edging is simply bright dipped, color buffed, degreased, lacquered. That's all!

55% saving This hard-to-handle ornamental banding now gets only a simple color buff, saving as much as the cost of the metal.

Formbrite

FINE-GRAIN DRAWING BRASS

an ANACONDA product

made by The American Brass Company

quality controlled

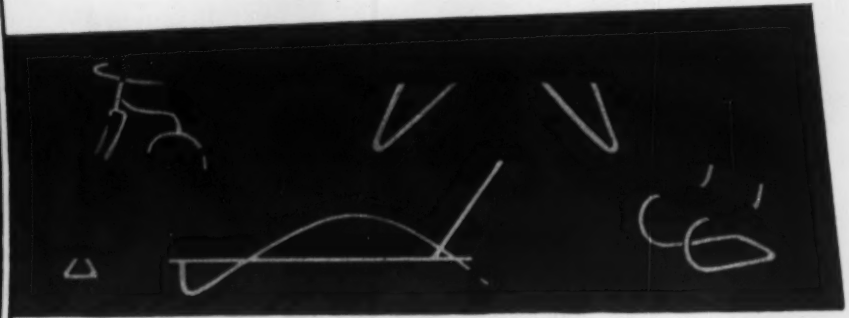
WHEATLAND

electric welded steel tubing

Quality and strength plus maximum bendability is yours in each length of WHEATLAND ELECTRIC WELDED STEEL TUBING.

A constant check and inspection is maintained from raw material through to the finished tube. In the Wheatland laboratories skilled metallurgists are on the lookout for new methods and materials to make your production job easier and quicker — to perfect the tubing that carries the name WHEATLAND.

Specify the quality steel tubing — order WHEATLAND.



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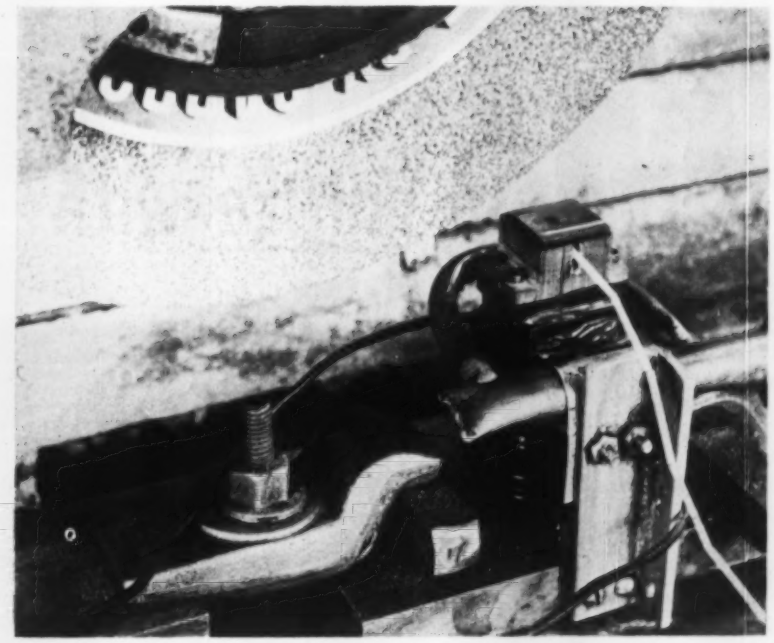
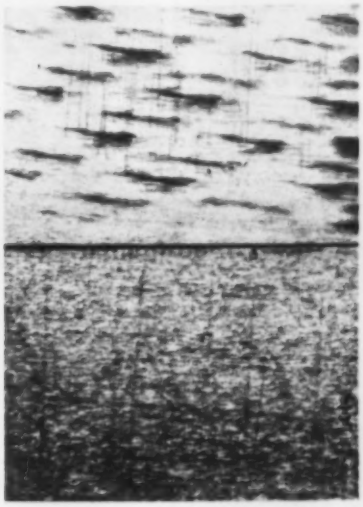


Top surface was ground conventionally. It shows oxides from overheating due to loaded region of the wheel. Bottom surface, ground with vibrations, has no burned areas



Vibration: An Ally for Grinding

THE GRINDING machine operator who claims he can grind by ear is probably right.

Studies at the University of Michigan show that induced high-frequency vibrations can improve surface finish, reduce the temperature in ground surfaces and reduce the incidence of thermal cracks.

The Shakes—Prof. L. V. Colwell, from the university's Department of Production Engineering, told members of the American Society of Mechanical Engineers about them at Boston.

Vibrations of 0.001-in. amplitude at 10 to 18 kilocycles per second were induced between the grinding wheel and the workpiece. Specimens were mounted on a transducer (laminations of 0.005-in.-thick pure nickel sheets wound with copper wire) and ground by a conventional surface grinding method. The only difference is that alternating current was fed into the transducer and thus to the workpiece.

Without quantitative study, Swedish machine tool people have recognized the importance of vibration in grinding. They specify both a maximum and minimum vibration for their grinders.

Results — Surface roughness measurements and microscopic checks of the swarf showed a 60 per cent reduction of roughness, from 40 to 16 microinches, when dry grinding hardened 52100 steel with an F-grade aluminum-oxide wheel. Peak specimen temperature was reduced—from 475 to 255° F.

Stress—Another group of tests gave good indications of difference in residual stress. Two 52100 full-hard specimens were ground at a work speed of 20 fpm, cross-feed of 0.050 in., depth of cut of 0.002 in. A resinoid-bonded wheel was used.

The conventionally ground specimen was so severely stressed that cracks were in all directions. Some penetrated more than 1/16-in. below the surface.

The specimen ground with vibrations showed four cracks. "It is obvious that the level of stress in the vibrated specimen was considerably less than in the one ground conventionally."

Mr. Colwell's conclusion is that it is feasible to use vibrations to enhance grinding of single-point carbide tools. Part of the story, of course, is that we may be using similar vibrations without knowing it. Slight vibration in the grinding machine could produce the desired results.

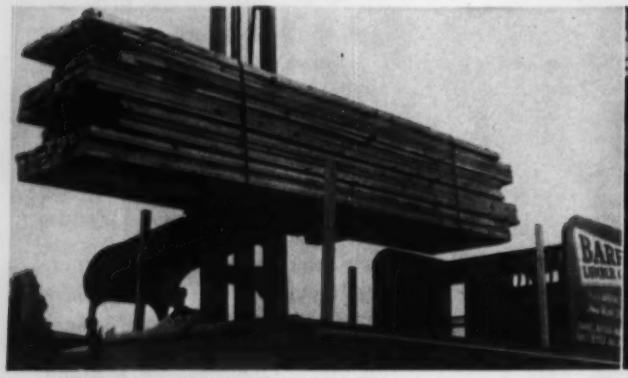
The vibrations have been put to single-point tools; they produce a high finish on low-carbon and alloy steels. They also aid in cutting the sluggish dead-soft aluminum.

AIM to unitize with

Unitizing of random length hardwood flooring permits quick and easy handling for storage. Idea S31

Steel landing mats for use by the armed forces are unitized for ease in handling. Idea S37

Automotive axles unitized for safe shipment and efficient handling with Acme Steel strapping. Idea S33



Unitized lumber is easily handled by fork truck from outdoor stocks to carrier. Idea S34

Self-palletized brick pack speeds up deliveries over former manual brick-by-brick loading. Idea S35

Acme Steel Strapping ideas . . . and save handling costs

Shipping many units strapped as one cuts loading and handling time to a minimum. Idea S36

Aluminum bar stock is self-palletized for easy handling in this unitizing idea. Idea S32

Unitizing—the art of preparing many packages or products into a single unit for handling—is proving to hundreds of manufacturers that shipping and handling costs can be cut—movements of materials speeded up. It's all in the application ideas brought about by the use of Acme Steel strapping and strapping tools . . . and the intelligence with which these ideas are originated and developed by your *Acme Idea Man. It's important to know, too, that unitizing isn't restricted to uniform squared-off packages; irregular product shapes and sizes can be unitized.

Talk to your *Acme Idea Man. He'll give you a shrewd analysis of shipping problems. You can reach him by calling the nearest Acme Steel office . . . or by using the coupon.

Remember—for you, the *idea* is the payoff.

ask your *Acme Idea Man to help solve your problems

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Get this new UNITIZING BOOK showing industrial unitizing ideas made possible by the use of Acme Steel Strapping. Fill out coupon on right.

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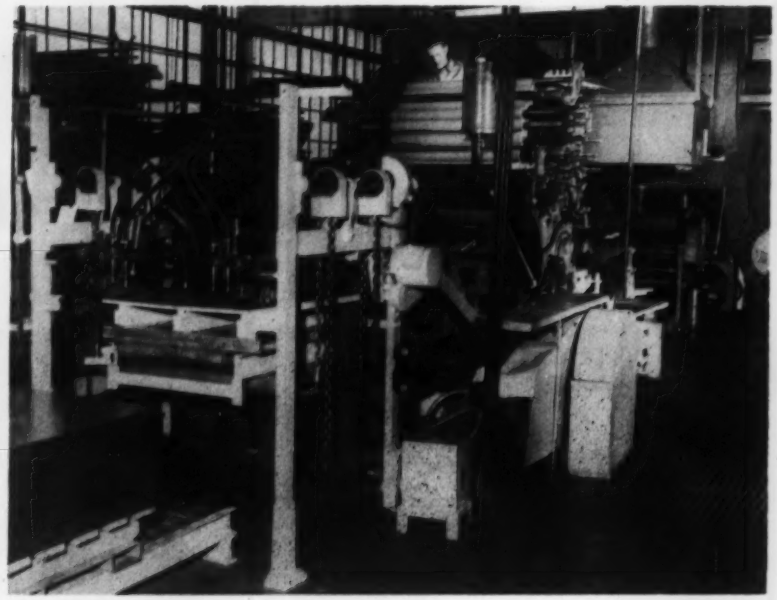
Volume is up a quarter after this company borrowed an idea from the printing industry. It's the no-hands handling that makes the difference



Mechanical feeder services the lithographing line. New loads are added without interruption of the feeding operation

Handling Uncorks Bottlecap Output

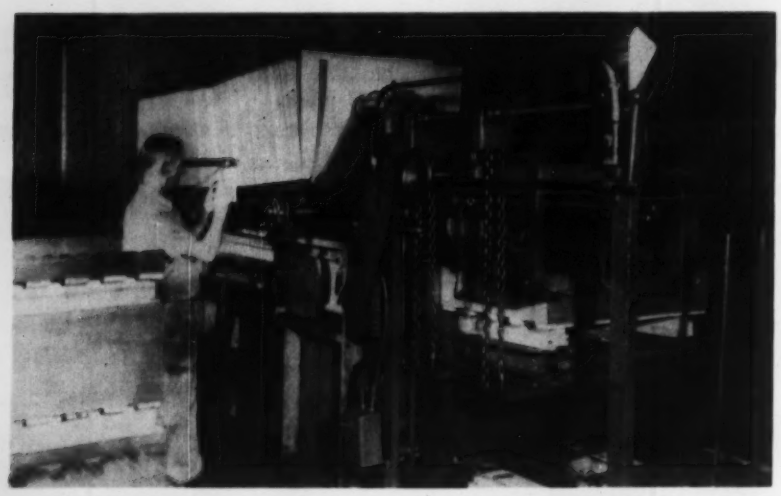
AUTOMATIC FEEDERS and pilers, not unlike the ones used by the printing industry, aren't at all out of place in the Chicago plant of W. H. Hutchinson & Son Inc. Instead of paper, these machines handle sheets of tin plate.

One of the leading manufacturers of bottle caps for soft drinks and beer (the industry calls them "crowns"), Hutchinson is getting an average of 25 per cent more volume since it mechanized its line.

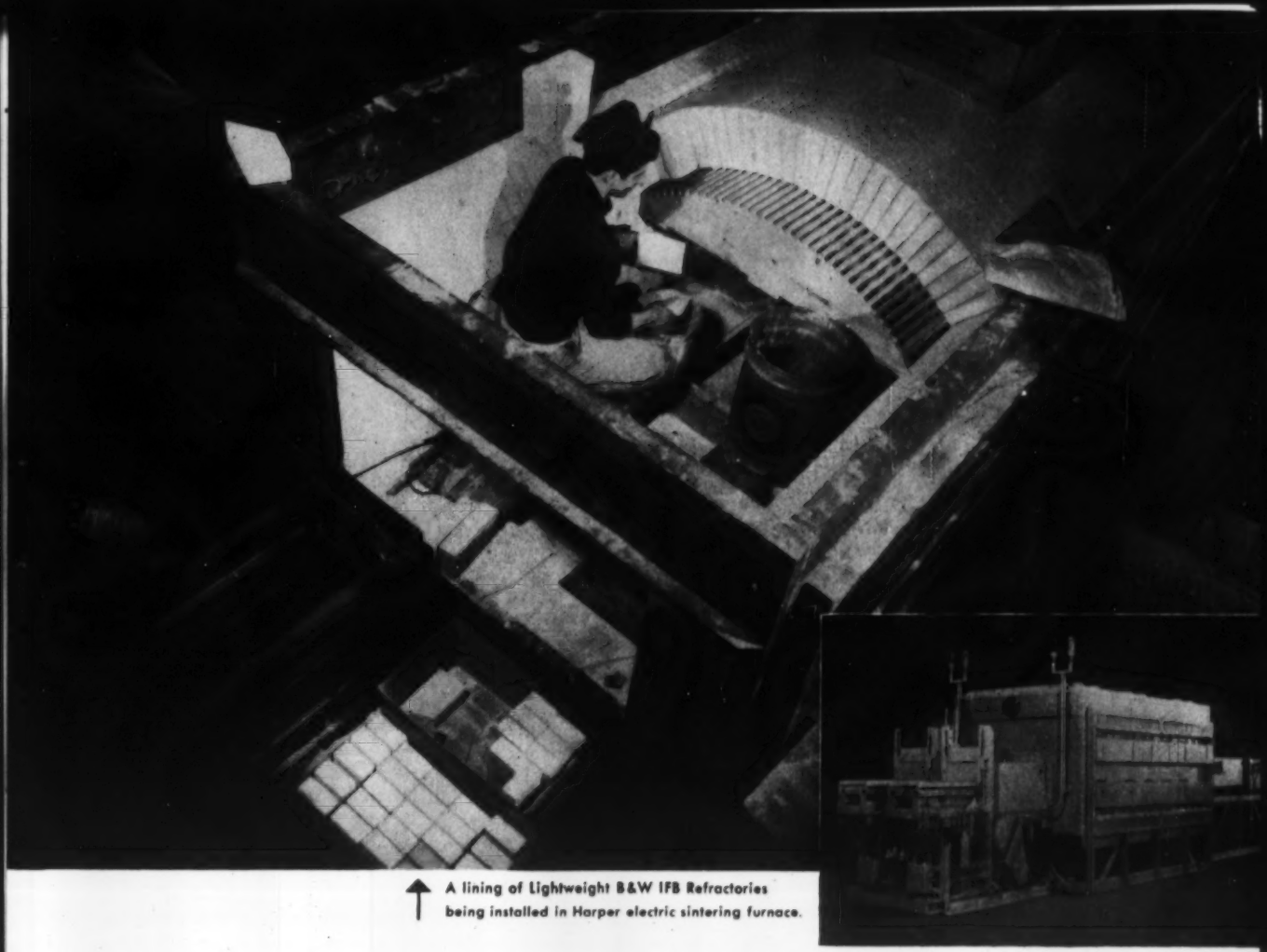
Starts with Feeders—Key components are automatic feeders. Developed by Dexter Folder Co., Pearl River, N. Y., they operate on the same principles as paper feeders for printing presses. Of course, they're more rugged.

Tin plate is deposited by fork truck on the elevator platforms of the feeders. The load is raised to engage the feeding mechanism—feeding and elevation of the load are automatically synchronized. The rising load first engages a pile governor which stops the elevator until the top sheet is fed off. As succeeding sheets follow, the governor actuates a control valve which continually lifts the pile into feeding position.

Air Takes Over—Suction cups do the lifting. The two rear cups move only vertically to lift the top sheet while a jet of air blows between sheet and pile to aid the separation. Two front suction cups lift and pivot forward. As they do, suction to the rear cups is released and a rubber-coated feed roll



From the lithographing machine, sheets pass through this baking oven and then are collected by the automatic piler



A lining of Lightweight B&W IFB Refractories being installed in Harper electric sintering furnace.

Refractories Maintenance Cut Down

ON HARPER ELECTRIC FURNACES AND KILNS

"Furnace linings that don't last as long as they should can shoot our customers' production costs 'sky high' —and take a big bite out of their profits."

That's one of the reasons why Harper Electric Furnace Corporation standardized on B&W Insulating Firebrick for the electric kilns and furnaces which they manufacture. They know from experience that "B&W IFB last longer than any insulating firebrick we ever tried."

The reason? Volume stable raw materials, unique quality control and manufacturing processes, including B&W's exclusive double burning at temperatures well above use limits—all these factors contribute to more uniform brick and longer life.

B&W IFB, the lightest weight insulating firebrick, also offer these advantages:

Cut electricity or fuel costs— Lighter in weight than any other insulating firebrick, B&W IFB store and conduct less heat. This means faster heating up time, less heat loss during furnace operation. Results? Lower electricity or fuel consumption —often 30% to 50% less than with ordinary heavy firebrick.

Cut installation costs — Hand fitting is easy and fast—B&W IFB can be cut, drilled or shaped on the job with ordinary hand woodworking tools.

Cut down-time — B&W IFB cool off quicker because they store less heat —make possible quick access to the furnace for inspection. Furnace gets back on the line faster, too, because B&W IFB heat up quickly.

These savings explain why B&W Insulating Firebrick are being used in thousands of applications . . . from the largest industrial furnaces to the smallest kilns. Contact your local B&W Refractories Engineer. He may point the way to new savings in your furnace.

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R 494

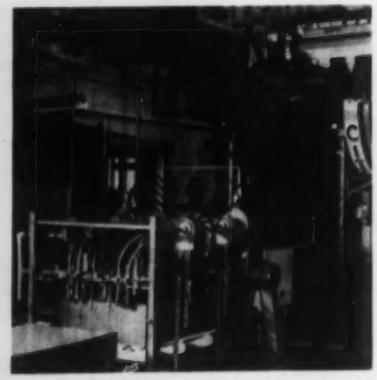
Sheets look like this after printing and before simultaneous punching

drops down and continues the sheet on its way.

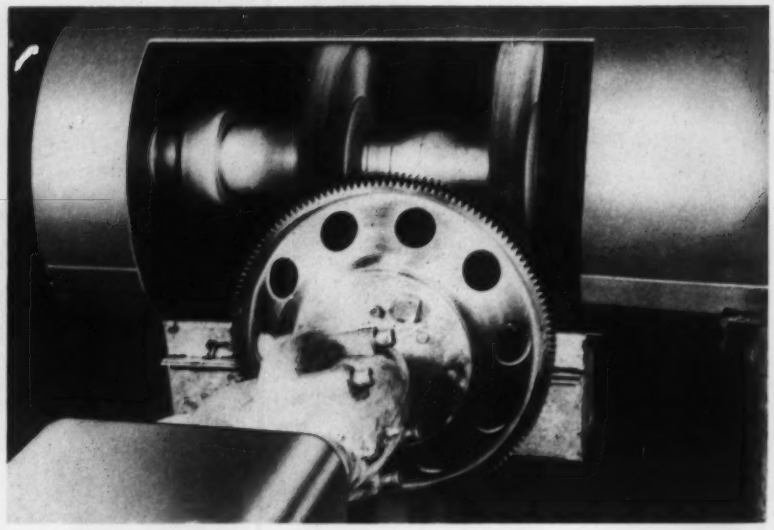
Each feeder has reject mechanisms which kick out double feedings automatically. A caliper device senses when more than one sheet has been fed from the pile.

Where They're Used—First application of the feeder is on the edge slitter at Hutchinson. To insure perfect registry in the color printing and gang stamping operations, each sheet of tin plate must be accurately trimmed. The same type feeder is used for the printing and stamping presses.

Pilers resemble feeders, minus suction cups. Elevator action is the same, but it descends as the load increases. When the pallet is loaded, special fingers receive the next several sheets until the full pallet is replaced by an empty one. This continuous feature is common to both pilers and feeders.



Callahan presses which form crowns, are mechanically fed, too



Rapidly revolving brushes remove burrs from gear teeth and blend surface junctures to reduce stress concentrations in the operating gear

Burrs Get Brush Off

DEBURRING and surface juncture blending bogged down aircraft gear output at Foote Bros. Gear Co., Chicago, until it tried automatic brushing.

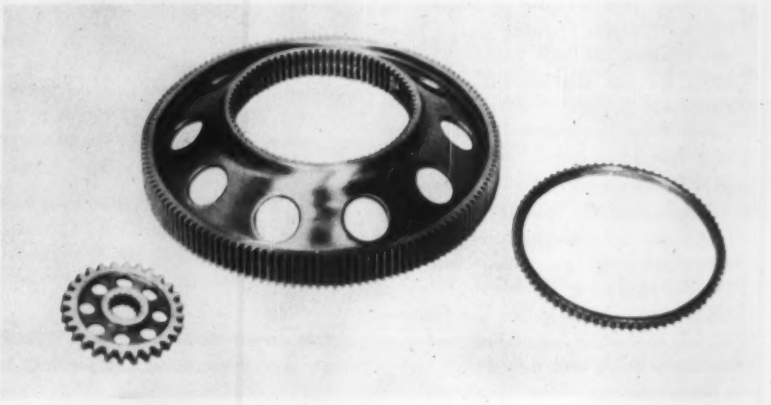
Now these jobs take only a fraction of the time they did and product quality is higher. Osborne gear brushing machines are operated about 90 hours a week and efficiently handle 25 types of gears.

Comparison — Production on a reduction gear, 12½-in. in diameter, used to be two units an hour when burrs were removed by a hand grinder followed by offhand brushing. The new machine deburrs and blends surface junctures on 15 in the same time.

Using the old method, an operator breaking the edges of a cam reduction gear, 3.3-in. in diameter, could turn out only 14 units an hour. The Osborn machine finishes 36 an hour.

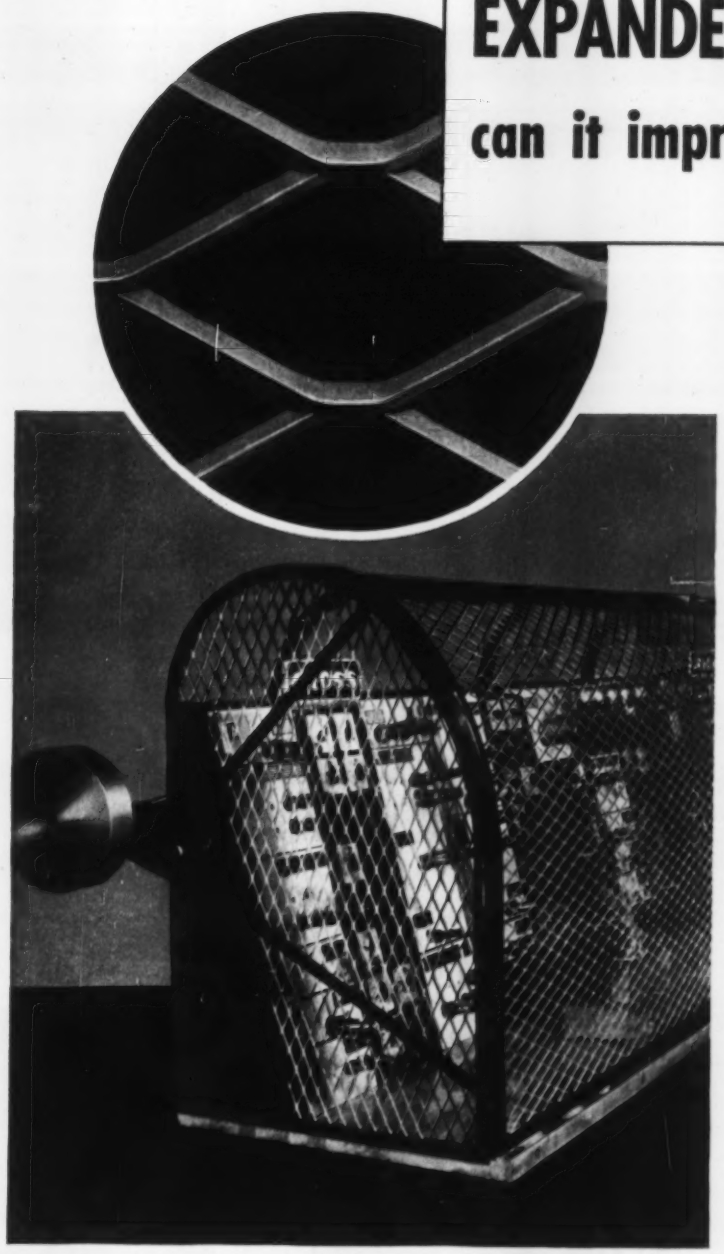
Procedure — Operation of the brushing machine is learned easily. After setup, the operator needs only to place the gear on a holder and press the start button. The holder rotates the gear against the brushes. A preset timer controls the length of the cycle and retracts the holder, stopping all action.

Three gears handled by the machine: (top) reduction gear drive, 12½-in. dia., 15 units an hour; (left) cam reduction gear, 3.3-in. dia., 36 units an hour; (right) high-ratio, clutch-oil-vent gear, 6.8-in. dia., 40 units an hour



EXPANDED ALUMINUM...

can it improve your product?



Penmetal expanded aluminum is sheet aluminum, slit and expanded to as much as ten times its original width. As expanded metal, aluminum loses none of its valuable properties. Rather it gains a number of characteristics which make it ideally suited for application to an almost limitless variety of products.

Penmetal expanded aluminum is up to 80% lighter per square foot than the original sheet. Yet it is stronger and more rigid. It permits free passage of light and air, and has that smart, clean, attractive look that typifies modern trends in design.

Besides aluminum, expanded metal comes in carbon steel, stainless steel, Monel, Inconel, and other metals. Large or small mesh; light or heavy gauge. Easily formed, shaped and welded.

Send for new four-page folder which gives mesh sizes, weights and dimensions, and shows a number of profitable ways to use this versatile material.

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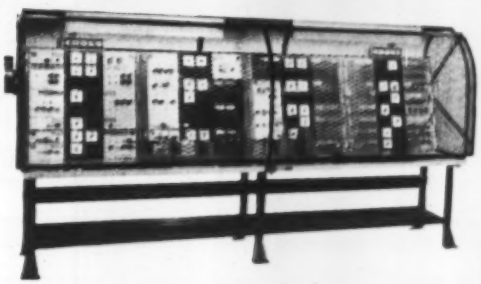

Expanded aluminum used to form a drum type guard over control and tool panel made by Cross Company, Detroit, Michigan.

PM-78

No. 17 in STEEL's Modern Heat Treating Series

Heat Treating Stainless Steels

PART II

By W. E. McFEE
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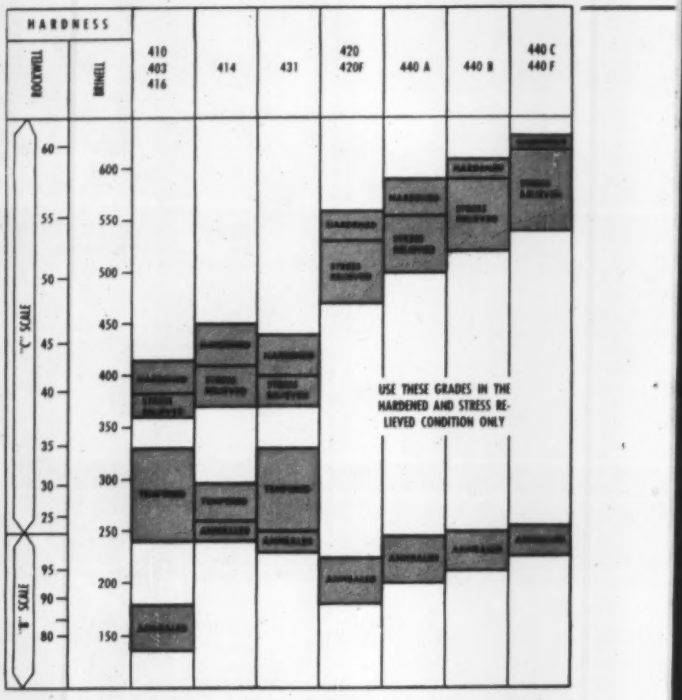


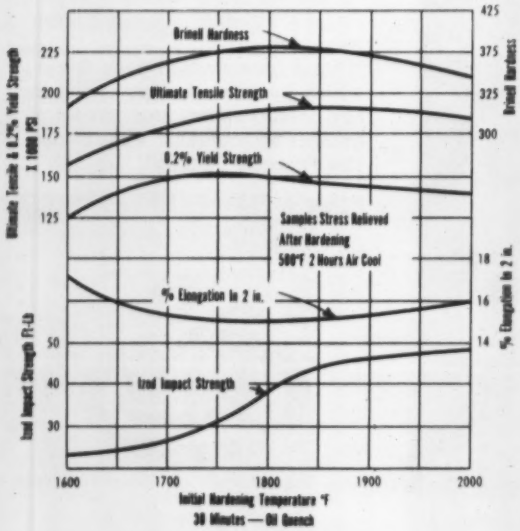
Hardness ranges of martensitic chromium types. Colored areas show range for best machinability. Chart is based on 1 in. diameter bars

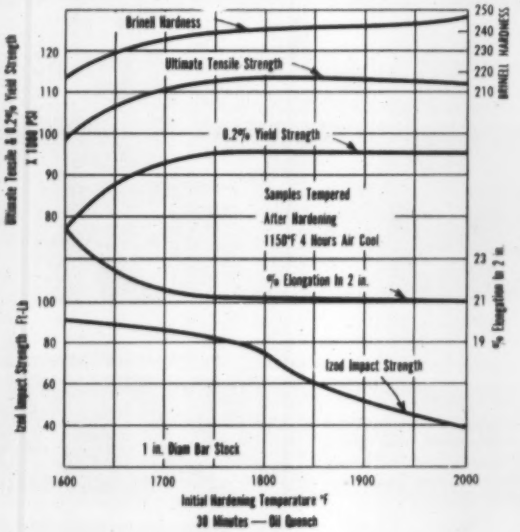
MARTENSITIC-chromium type stainless steel alloys are hardened to a high degree by quenching from an elevated temperature. With heat treatment, they act much like carbon and low alloy steels. The chart above shows how they respond.

Tempering of the high carbon grades, types 420, 420F, 440A, B, C and F, is not good practice. They give maximum corrosion resistance when stress relieved after hardening.

Hardening is done by heating above the critical or transformation temperature, then rapidly cooling in oil or air (Fig. 1).

Schedules — Preheating types 410, 403, 416, 414 and 431 usually is unnecessary. But, generally, it





How hardening temperature affects properties of type 410 bar stock. Fig. 3 (left) stress relieved after hardening. Fig. 4 (right) tempered after hardening

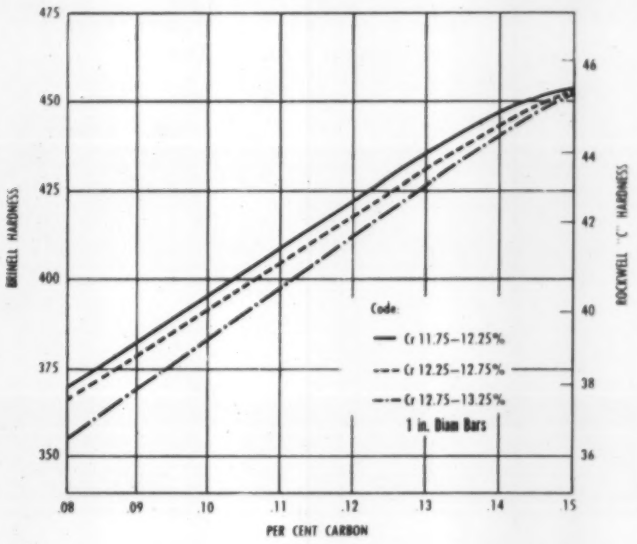


Fig. 1—How carbon and chromium affect the as-quenched hardness of types 410, 403 and 416

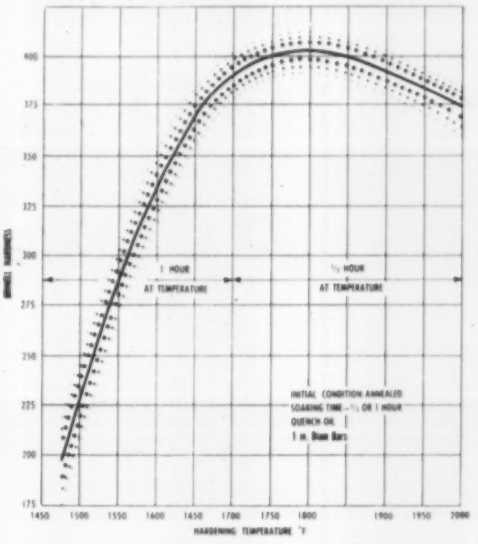


Fig. 2—How hardening temperature affects hardness of types 410, 403 and 416 bar stock

is recommended for the high carbon grades. With these grades (types 420 and 440), small sections should be heated quickly to 1450°F.

Large sections should be started at 1000°F, then raised slowly to 1450°F. Preheating time should be long enough for parts to be soaked through. After preheating, parts should be raised quickly to hardening temperature. Fig. 2 shows the influence of hardening temperature on hardness.

When stress relieving or tempering is to be done later, parts should be hardened from a temperature near the maximum hardness. Table 1 gives normal hardening ranges with "as-quenched" results.

Later Effects—The temperature used for hardening influences somewhat the properties later obtained from stress relieving or tempering. Table 2 shows how it affects impact values of type 431.

The effect of hardening temperatures on properties of type 410 after stress relieving and tempering is shown in Figs. 3 and 4.

How Long?—Enough time must be allowed at hardening temperature for parts to heat uniformly to temperature. Once there, long soaking is not desirable. Ten to fifteen minutes are enough for small parts, a half an hour for large sections.

All hardenable stainless types will harden fully and uniformly in oil quenching or air cooling. Slightly higher hardness usually comes from oil quenching. Air cooling is best for irregular and sharp-filleted sections.

Water quenching is likely to produce quench cracks, especially in

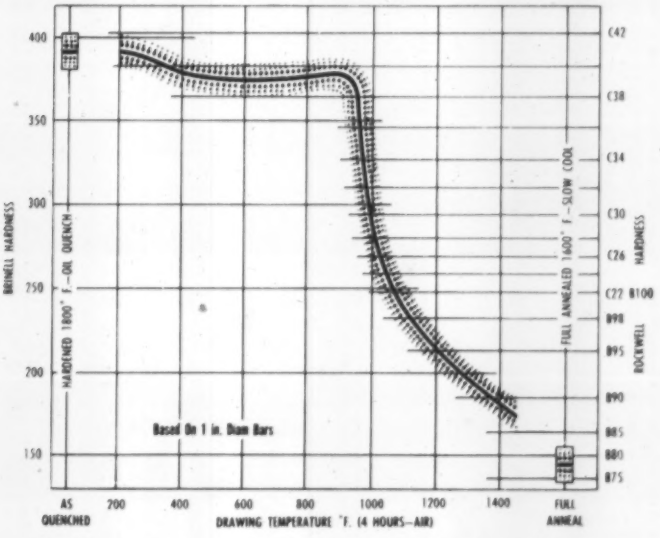


Fig. 5—How drawing temperature affects hardness of types 403, 410 and 416

TABLE 1—Stainless As-Quenched Hardness Values

Type	Quenching Temperature	Hardness Brinnel	Hardness Rockwell
410, 403, 416	1700-1850°F	380-415	C39-43
414	1800-1950°F	400-450	C42-47
431	1800-1950°F	400-440	C42-46
420, 420F	1800-1900°F	530-560	C53-56
440A	1850-1950°F	555-590	C55-58
440B	1850-1950°F	575-610	C57-59
440C, 440F	1850-1950°F	620-630	C60-62

Based on 1 in. diameter bars

TABLE 2

How Quenching Temperature Affects Impact Value of Type 431

Condition	Quenching Temperature	Izod Impact Strength ft/lb
Stress relieved (600°F)	1800°F	15-25
	1950°F	30-60
Tempered (1100°F)	1800°F	55-80
	1950°F	45-55

the high-carbon grades. These types should be quenched in warm oil.

Rule—Parts to be stress relieved or tempered should not be transferred from the quenching tank to furnace until they are cooled below 500°F. Either stress relieving (300-700°F) or tempering (1000-1400°F) should always follow hardening.

Stress relieve immediately after quenching. Even though it causes a slight reduction of "as-quenched" hardness, it's made up by better ductility, toughness and elastic properties. Table 3 gives ranges for stress relieving with typical results.

Versatile — Selective tempering of types 410, 403, 416, 414 and 431 can produce a wide range of tensile properties and hardness. Hardenable stainless types develop lower impact strength when tempered between 750 and 950°F.

If tempering temperature is raised and time increased, tensile strength, yield strength and hardness decrease. Impact strength, elongation and reduction in area are improved.

Fig. 5 shows how tempering temperature affects the hardness of types 410, 403 and 416. It is based on material having "as-quenched" hardness of 380 to 400 Brinell.

Time at tempering temperatures generally is 1 to 4 hours. Longer time is needed for the lower temperatures. Trial tests often are desirable where lots are to be tempered to narrow hardness ranges.

Insurance—Normally, hardening and stress relieving are necessary for satisfactory corrosion resistance.

Lower carbon types give best corrosion resistance after stress relieving between 450 and 700°F. The 850 to 1050°F heat treatment hurts corrosion resistance. Tempering above 1050°F restores it.

When the higher carbon types are tempered above 850°F, corrosion resistance is much more impaired.

Annealing—To fully soften the hardenable grades, they are heated above lower critical temperature and cooled slowly. Time at temperature should be from 1 to 3 hours, depending on load.

Cooling rate is between 25 and 50°F per hour. Slower rates give slightly lower hardness. Slow cooling usually is stopped at 1100-1200°F. Material is withdrawn from furnace and cooled rapidly.

Full annealing treatments are not always necessary unless maxi-

TABLE 3—Results of Stress Relieving

Type	Temperature	Time	Hardness Brinell	Hardness Rockwell	Average Mechanical Properties: Ultimate Tensile Strength psi	0.2% Yield Strength psi	% Elong. in 2 in.	% Reduction of area	Izod Impact Range ft/lb
410, 403	450-700°F	1 to 3 hr	360-380	C37-40	180,000	140,000	15	55	20-45
416	450-700°F	1 to 3 hr	360-380	C37-40	180,000	140,000	13	45	15-35
414	450-700°F	1 to 3 hr	370-400	C38-42	190,000	145,000	15	55	30-60
431	450-700°F	1 to 3 hr	370-400	C38-42	195,000	135,000	15	55	30-60
420	300-700°F	1 to 2 hr	470-530	C48-53	230,000	195,000	8	25	5-15
440A	300-700°F	1 to 2 hr	500-560	C51-56	260,000	240,000	5	20	3-6
440B	300-700°F	1 to 2 hr	520-590	C53-58	280,000	270,000	3	15	2-5
440C	300-700°F	1 to 2 hr	540-620	C55-60	285,000	275,000	2	10	1-5

Based on 1 in. diameter bars

JAL-TREAD FLOORPLATE
THE SHORTEST DISTANCE BETWEEN

The straight-line pattern of J&L Jal-Tread raised cleats plus the strength and toughness of high quality steel combine to provide floor plate with both safety and economy.

Whatever your application . . . in new construction, new equipment or replacement, you'll find Jal-Tread offers you the shortest way to:

Safe Footing—300 miniature squares per square foot—all of uniform height—provide maximum linear friction surface, protect against lost-time accidents.

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For safe, long-lasting flooring always specify J&L Jal-Tread . . . *it's available at leading distributors everywhere.*

J&L STEEL

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STEEL CORPORATION — *Pittsburgh*

mum softness and ductility are required for severe cold forming. A process anneal just under the critical temperature gives sufficient ductility. Temperatures for these processes are given in Table 4.

THE PH GRADES

17-7PH—To harden this Armco alloy (received in condition A) the soft, annealed material is heated for 1½-hour at 1400°F, then air or water cooled to 60°F or lower within 1 hour.

Holding time at 60°F must be long enough to cool uniformly throughout the section. After this treatment, 17-7 PH is in a structure of intermediate hardness, referred to as condition T.

More Hardness—The 17-7 PH alloy, condition T, may be reworked to eliminate distortion resulting from heat treatment. After working, the material may be further hardened, using a temperature in the 950-1150°F range.

When hardened, it is designated in condition TH, plus the numerical value of the hardening temperature. For example, TH 1050 means material hardened at 1050°F.

Highest hardness and strength are obtained at 950°F, but this treatment generally is not recommended because toughness is quite low.

Versatile—The purpose of the variety of final heat treatment temperatures is to fit the alloy to the particular use of the designer. As hardening temperatures go above 1000°F, the material becomes more ductile and corrosion resistance goes up. By experimenting with heat treatments, the designer can choose a wide range of final properties.

When annealing hot worked or forged material, the metal should be heated to 1950(±25°F) for 3 minutes for each 0.1 in. of thickness, then air cooled.

High Strength — Condition C cold worked, spring temper material is heat treated to extremely high strength levels by a 900°F heat treatment for 1 hour, then air cooled. If an air furnace is used, the material heat tints lightly. This is easily removed.

There is a dimensional increase when 17-7 PH changes from condition A to condition T in the 1400°F heat treatment. The overall effect is an increase of about 0.004 in. per in. On heat treating condition T to condition TH there is a slight contraction (about 0.0005 in. per in.).

17-4 PH Bar and Wire—For maximum hardness and strength, material from the solution treated, annealed condition is heated for 1 hour at 875(±25°F) and air cooled to room temperature. If in the solution annealed condition (condition A), hardening may be done without further heat treatment. If hot worked, the hardening cannot be done until the work has been annealed.

Can Be Adjusted—Where ductility in the hardened condition is needed, this property can be varied by changing the temperature used for hardening.

Other hardenable stainless steels require hardening, plus tempering or stress relieving. However, 17-4 PH can be hardened to what's needed in one operation. By varying the heat treatment between 875 to 1200°F, for 1 to 4 hours, a wide range of properties are produced.

Rework—Material not ductile enough in the hardened condition can be retreated at a higher temperature to increase impact strength and elongation. This can be done without a prior solution anneal.

For hot worked or forged material, a solution anneal at 1875 to 1925°F for ½-hour is good practice. This should be followed by air cooling and a water or oil quench to 90°F, or lower, before hardening. Oil quenching is used on small, simple sections. This treatment will make hardened material more uniform.

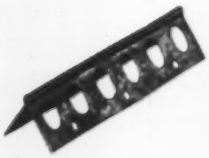
After hardening a predictable volume change also takes place in 17-4 PH—a contraction of .0004-.0006 in. per in.

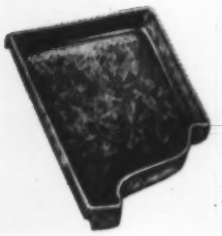
TABLE 4—Annealing Stainless Hardenable Grades

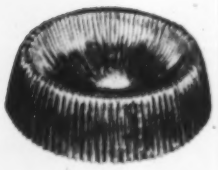
Type	Hardness Brinell	Hardness Rockwell	Average Mechanical Properties: Ultimate Tensile Strength psi	2% Yield Strength psi	% Elongation in 2 in.	% Reduction of Area	Izod Impact Range ft/lb
Full Anneal and Slow Cool							
410-403	135-160	B75-83	78,000	40,000	35	73	95-115
416	135-160	B75-83	78,000	40,000	31	62	80-95
420	170-200	B86-93	90,000	50,000	27	60	20-40
440A	205-230	B94-98	105,000	55,000	20	45	10-20
440B	215-240	B95-C20	110,000	57,000	17	35	7-20
440C	230-255	B98-C23	115,000	60,000	15	25	5-20
Process Anneal							
410-403	170-195	B86-92	90,000	65,000	27	67	95-115
416	170-195	B86-92	90,000	65,000	25	60	50-70
414	240-255	B99-C24	120,000	95,000	20	62	55-80
431	240-295	B99-C30	135,000	105,000	18	55	50-80
420	205-225	B94-97	105,000	80,000	23	55	45-75
440A	230-245	B97-C22	115,000	85,000	21	50	15-30
440B	235-250	B98-C23	120,000	95,000	17	35	10-25
440C	250-270	B100-C26	125,000	100,000	12	25	5-20

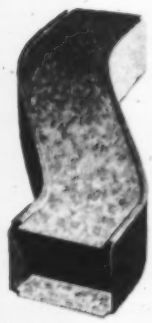
Based on 1 in. diameter bars
Types 420F and 440F same as 420 and 440C except slightly lower ductility and impact strength

This is the second of two articles on heat treating stainless steels. The first appeared last week. Extra copies of both are available in quantities from one to three until supply is exhausted. Write Editorial Department, STEEL, Penton Bldg., Cleveland 13, O.









A CHALLENGE!

THE STRONGEST MADE BY ANY GALVANIZED SHEET:

Anything that can be made of steel sheets can be made of

WHEELING

SOFTITE®

galvanized sheets!

IF you've been having difficulty fabricating galvanized sheets, try Wheeling SOFTITE Galvanized Sheets.

Here are sheets you can work to the limits of the base metal . . . so ductile, so tight-coated, you can use them for anything you make of steel sheets.

Bead it, draw it, seam it . . . you name the operation . . . Wheeling SOFTITE will take it and come back for more . . . with never a trace of chipping or flaking of coating. And for good reason—SOFTITE *has the tightest zinc coating yet produced.*

Put SOFTITE to the test. See for yourself why the demand for SOFTITE has forced Wheeling to triple its production facilities in 1955.

Galvanized steel does it better . . . SOFTITE does it best!

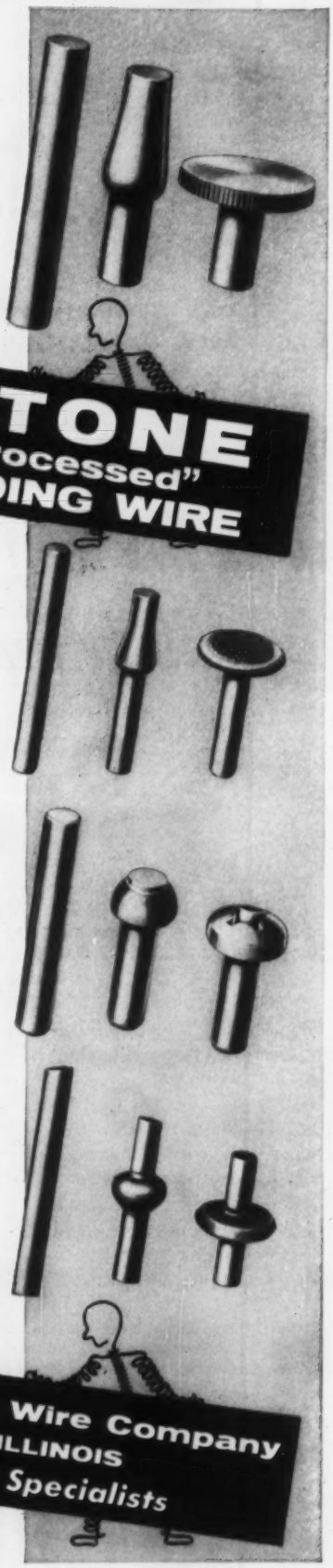
For full information, call or write the Wheeling sales office nearest you.

District Sales Offices: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Houston, New York, Philadelphia, St. Louis, San Francisco

WHEELING STEEL CORPORATION, WHEELING, WEST VIRGINIA

IT'S WHEELING STEEL

Wire that's *BEST* for difficult cold heading



KEYSTONE
"Special Processed"
COLD HEADING WIRE

The terrific displacement of metal during the cold heading process requires a wire that's *processed specifically* to meet the exact requirements of the job.

In plants where Keystone "Special Processed" Wire is specified for difficult cold heading, production records show these valuable results: (1) increases the production rate which *lowers cost per unit;* (2) greatly prolongs die life which *reduces machine down-time and labor costs;* (3) provides higher quality finished products which *minimizes rejections and inspections.*

Call on our wire specialists for assistance on any problem concerning steel wire. Contact your Keystone representative or write direct.

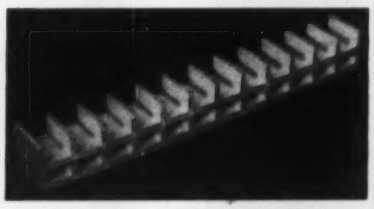
Keystone Steel & Wire Company
PEORIA 7, ILLINOIS
Industrial Wire Specialists

Takes Away the Heat

Because aluminum transmits heat rapidly, it makes good cooling panels for carrier decks

EXTRUDED ALUMINUM deck panels help protect Uncle Sam's aircraft carriers.

Produced at the Halethorpe, Md., plant of Kaiser Aluminum & Chemical Corp., the panels have multiple holes through which sea water is circulated. They are placed in the carrier deck around the plane launching catapults to dissipate heat from exhaust blasts of jet planes.



EXTRUDED COOLING PANEL
. . . sea water circulates through holes

Each section is 12 in. wide and contains 12 longitudinal holes. Sections are produced in four lengths: 10 ft 4 in., 12 ft, 13 ft 3 in. and 17 ft 8 in. They are made of 6063 (63S) aluminum alloy in T6 temper.

More Springs Per Tool

Carbide-tipped forming and cutoff tools reduced tooling costs 1200 per cent in a year at International Business Machines Corp., Endicott, N. Y.

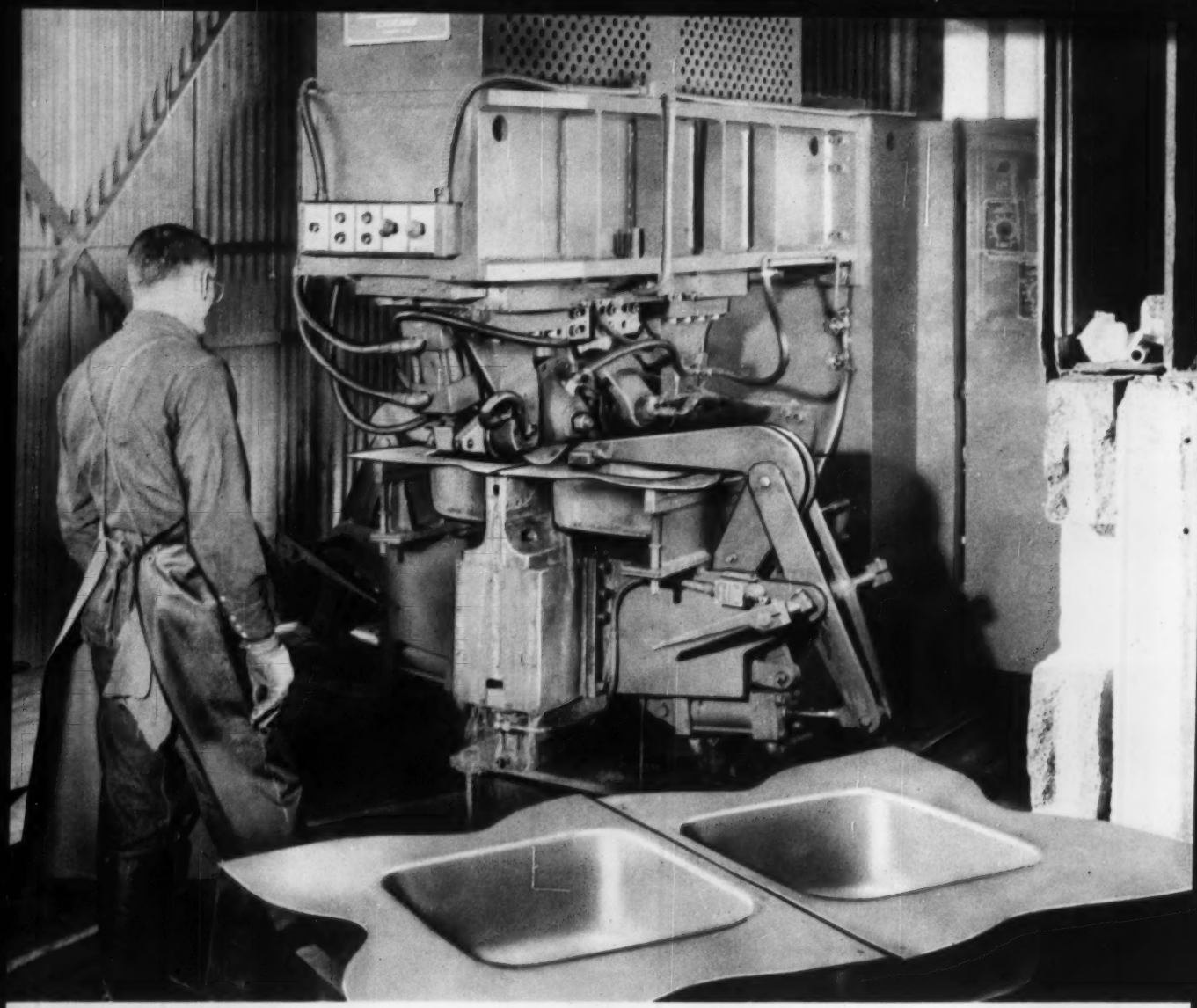
The job is turning out small formed wire detent springs. They position and retain electrical contact points in plug boards used with high-speed tabulating equipment made by IBM.

Process—Flattened 304 stainless wire, 0.020 in. in diameter, is fed into two automatic wire forming machines. Capacity of each is 28,000 springs an hour, using five high-speed steel tools.

But tooling costs were high because the tools wore out and had to be replaced every 30 days.

IBM installed two sets of forming and cutoff tools tipped with Carboloy grade-55 carbide. They operated for a year without downtime for service or replacement.

...are you PROUD of your
KITCHEN SINK?
SOUTHERN PORCELAIN
is proud of theirs . . .
Down in Dallas (Texas, where they make them, that is) they're *real proud*, Pardner! It's the combination of greater sales appeal and lower production costs that's pleasing them so!
Southern Porcelain's mighty pleased with Sciaky resistance welding, too! That's what improved their methods and cut their costs and increased their product sales appeal!
Are you proud of *your* "kitchen sink"? You can be . . . because, the chances are, you can simplify *your* production methods and lower *your* production costs with Sciaky resistance welding —just like Southern Porcelain did!
SCIAKY
Largest Manufacturers of Electric Resistance Welding Machines in the World
GO AHEAD
turn the page and see the facts on Southern Porcelain's resistance welding operation . . .



High production Sciaky resistance welding joins

TEN THOUSAND UNITS WITH LESS THAN 1% SCRAP FACTOR

Other methods of fabricating Double-Sinks FAIL!

How old is "antique"?
...with resistance welders it may be only five years because of recent Sciaky technical achievement.

Production limitations and high operating cost make these antiques "expensive." You can't be competitive if your product won't let you compete!

Within ten days of delivery, one Sciaky mash welder with an inexperienced operator joined 10,000 sink units with less than 1% scrap factor for Southern Porcelain in Dallas, Texas. Not only quality and production beyond expectation, but metal finishing operations were minimized.

For almost a year Southern Porcelain unsuccessfully tried every conceivable method to join two 14 gauge Armco deep drawn steel sink units to fabricate a double-sink. Reject rates ran high because porcelain finishing demanded a strong, smooth, non-porous joint.

The relatively simple solution to this problem is actually the product of Sciaky's basic philosophy in design—resistance welding to do *more useful work* at *lowest operating cost* with *maximum reliability.*

You can read all the details of this interesting application *free*—send your name and title on company letterhead for your copy of "Resistance Welding At Work", Vol. 4—#6.

Largest Manufacturers of Electric Resistance Welding Machines in the World

SCIAKY®

Sciaky Bros., Inc., 4910 West 67th Street, Chicago 38, Ill., Portsmouth 7-5600

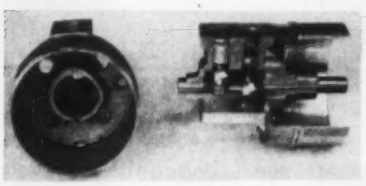
Design for Economy

Diecast aluminum housing for air conditioning compressor cuts machining time

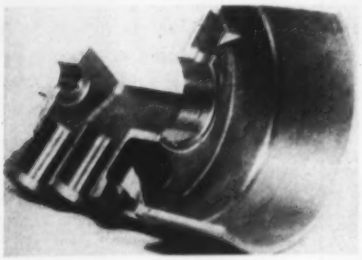
A LIGHTWEIGHT, compact and economical compressor—heart of the York room air conditioner—is made possible by diecasting the compressor and motor housing of aluminum.

The housing is a complex unit, containing cast-in bearing surfaces and cylinder linings. Concentricity with exact location of center lines is a key factor in casting the part.

How It's Done—To obtain this, three equidistant chucking surfaces are established in the die, which in turn produces like surfaces in the raw diecasting. Centers are located on a circle concentric with and perpendicular to the center line of the housing shaft.



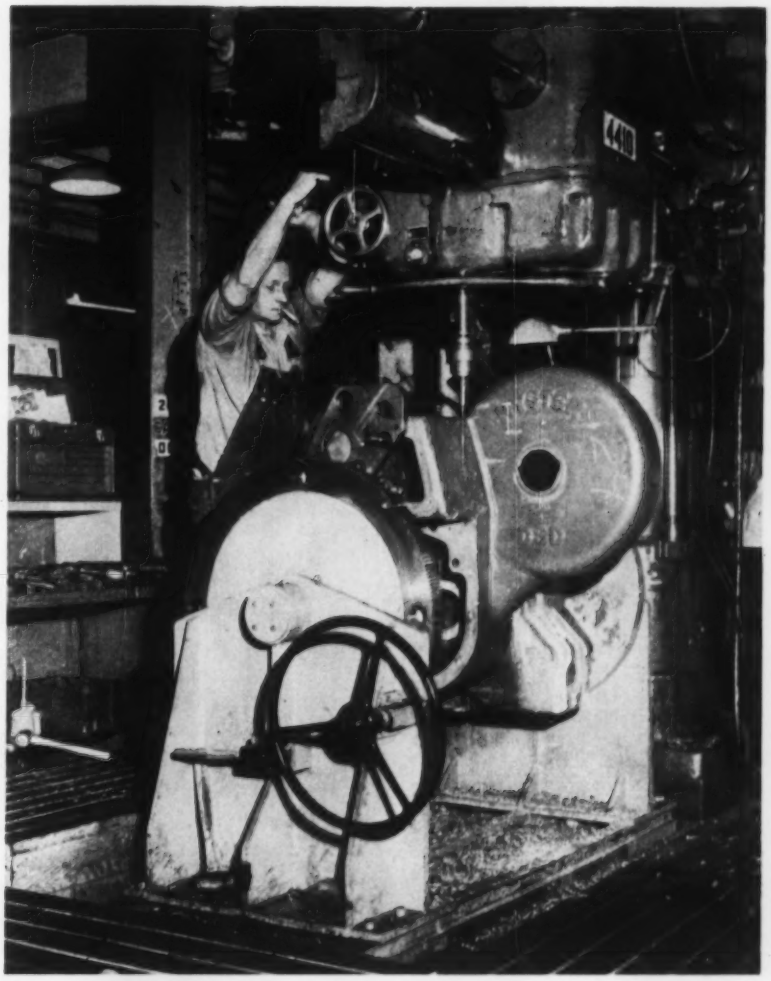
ONE-PIECE HOUSING
. . . cutaway reveals diecast pistons



CYLINDER LININGS
. . . cast-in the diecast housing

A cone, of which this circular plane is the base, reaches its apex at the small bearing bore in the compressor end of the housing. Using this cone as a reference, all center lines and true surfaces are established throughout the diecasting.

York Corp. specified that the housing be diecast from aluminum alloy ASTM Spec. SC84B. Aluminum diecastings also are specified for the two pistons and connecting rods.



Hyster built this indexing fixture to . . .

Drill More Holes in Less Time

A UNIVERSAL trunnion index fixture trimmed drilling time 20 per cent at Hyster Co., Portland, Oreg. The company built the unit to position and drill the side frames and transmission housings of three of its towing winches.

Maximum swing of the fixture is 33 in. It has adjustable center spacing (23 to 51 in.) between brackets.

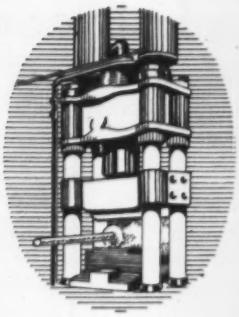
Gear Indexed—The unit is gear indexed with a large handwheel; it can be motorized. Spring-loaded, plunger-type index pins assure positive location. The fixture is indexed at 90 degrees, with one special location at 30 degrees.

Drill jigs are mounted on the trunnion with four ½-in. dowels and fourteen ½-in.-13 Allen capscrews. End bracket spacing is done with a screw and plate mounted to the end of the fixture base.

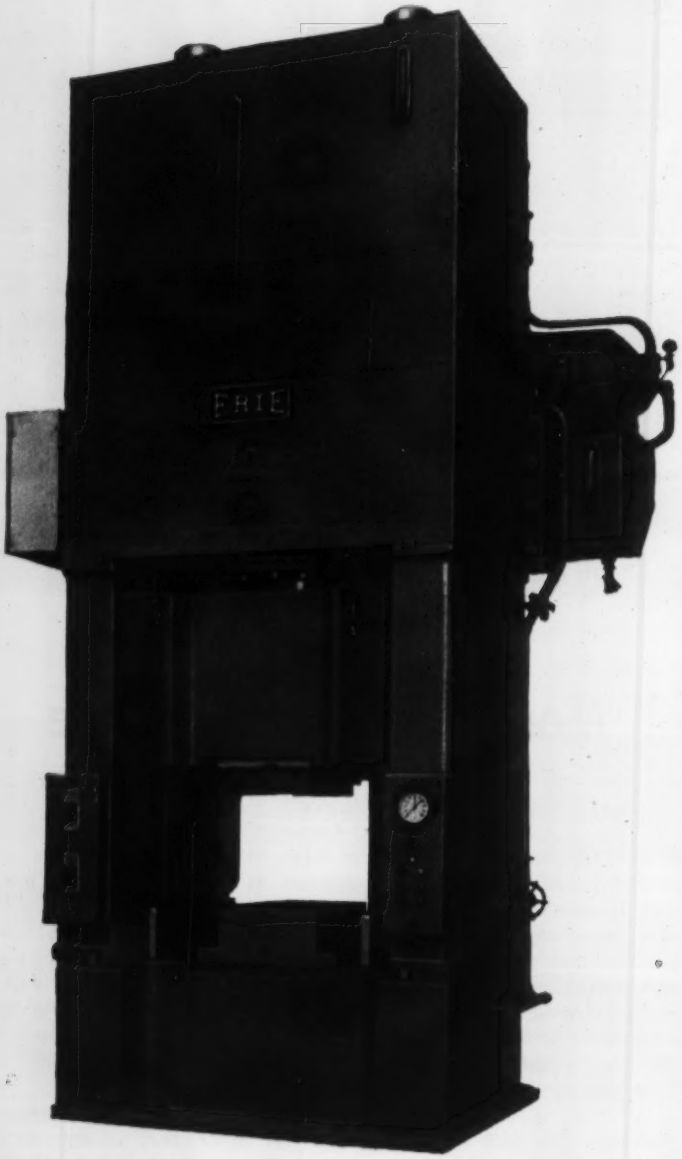
Hyster uses another trunnion with the same basic design (its base is longer to give a maximum bracket spacing of 76 in.) for drilling a lift truck steering axle.

in the good old days

When press forging was done on steam hydraulic presses, water intensified . . . power strokes were short and slow.



Even then ERIE was the greatest name in forging machinery in both presses and hammers . . .



today

Erie Foundry has just built this extremely fast hydraulic forging press. This 1000-ton semi-automatic machine, used to forge jet engine turbine blades by a special process, completes a *6" stroke cycle in just 4 seconds.*

Its high speed is achieved by using two self-contained pumps. This forging press incorporates speed control with automatic pressure and precision reversal by means of a special compression and decompression feature, designed by Erie hydraulic engineers. Maximum stroke is 28". A long (1 to 1) guide ratio insures accuracy. By combining side housing and strain rod construction, the machine is made rigid and produces perfect forgings.

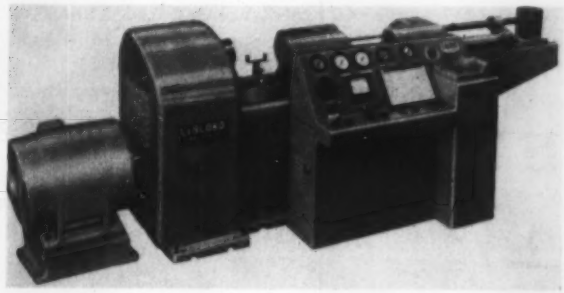
Just one more indication of why Erie Foundry is today the greatest name in forging machinery.

in our 60th year

ERIE

ERIE FOUNDRY CO. ERIE, PA.

New Machines Speed Cutting



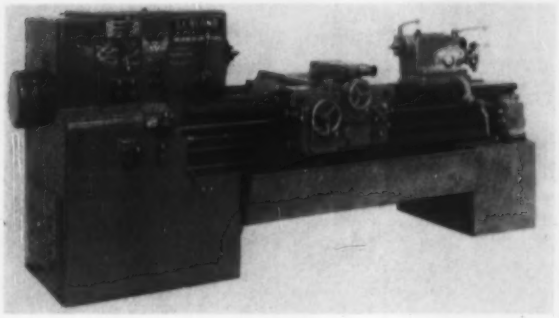
Engine Lathe—Here is a 16-in. heavy duty lathe that offers 27 spindle speeds from 16 to 2000 rpm. Speeds are quickly selected with a color plate.

The heavy apron has four-directional, power rapid traverse which moves the cross slide and the carriage by means of a single lever.

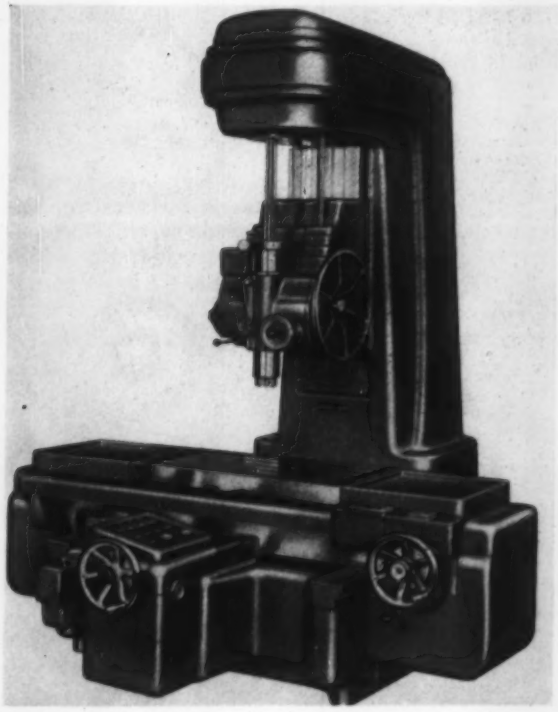
Other new tools: 25 and 32-in. heavy duty engine lathes; 13, 15, 17, and 19-in. lathes; a 15-in. dual drive lathe; a 25/50-in. sliding bed gap lathe; and an automatic line bearing crankshaft machine. *Write*: R. K. LeBlond Machine Tool Co., Cincinnati, O. *Phone*: Jefferson 1-0910

Rapid Borer—This machine will bore, trepan or counterbore from three to eight times faster than the D-bit method. It will drill 1⅛-in. holes in stainless 303 at better than 7 ipm.

The rapid borer was developed to use new tooling which cuts at high speed with excellent accuracy and finish. Cutting oil is forced between the boring bar and hole wall, forming a continuous bearing. It flushes back through a hole in the boring head and bar. Chip form is controlled by tool angles and proper feed and speed combination.



Automatic Operations Boost Accuracy



Jig Borer—On this machine, dimensions are set right from blueprints to direct-reading drum dials, one for each longitudinal and traverse measurement.

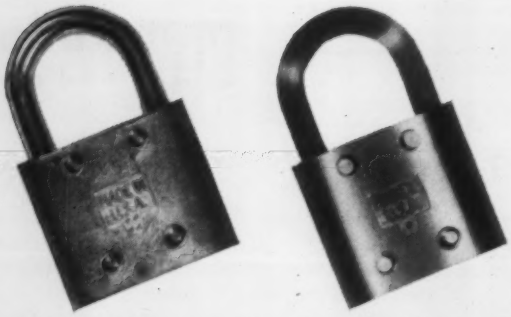
The new system, combined with automatic positioning, enables the operator to obtain precise locations of table and saddle by setting dimensions and pushing the positioning button on the control panel. Table and saddle automatically position to the dimensions shown on the drum dials. Accuracy: ±0.0001 in.

Advantages: Accuracy is not dependent upon screw threads. High precision gages are enclosed and are not touched by the operator. Damage from handling and dimensional changes caused by the heat of the operator's hand are eliminated. Easy-to-read dials enable the operator to make settings quickly; errors in the use of micrometers or optical measuring instruments are eliminated.

Sixteen spindle speeds (from 30 to 1800 rpm) are offered; eight feeds range from 0.0005 to 0.010 in. per revolution of spindle.

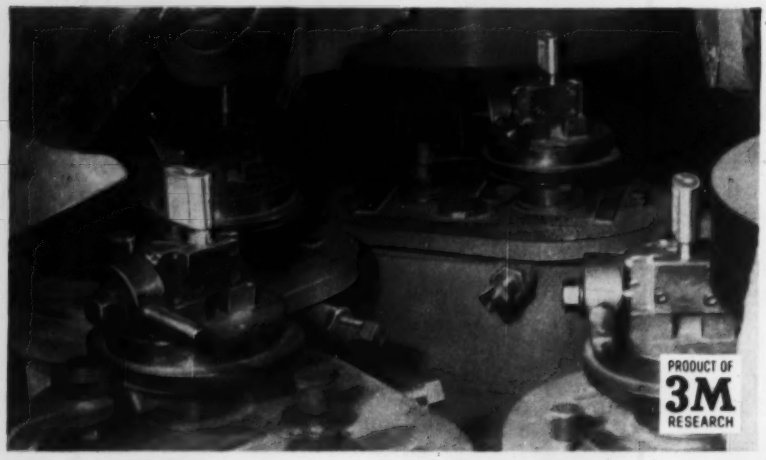
Dial selectors enable the worker to preselect the feed and speed of the next operation while the machine is running. Pushbutton changing of feeds and speeds is done by multidisc clutches.

A wide bed gives maximum support to the table and saddle. Leveling screws provide a three-point support for the bed. All ways are hand scraped, lubricated by a one-shot oiling system and protected



How would you SOLVE IT?

1 PRODUCTION PROBLEM:
To speed production and cut costs of grinding, polishing and finishing household locks. Slaymaker Lock Co. was using set-up wheels on an automatic three-head grinding machine, but was getting poor quality, non-uniform finishes. To solve this problem, a 3M Representative made the following recommendation:



2 SOLUTION:
He suggested that this Lancaster, Pennsylvania manufacturer switch to the 3M Method using Three-M-ite Resinite Cloth Belts—Grits #80, #120, #150 and #180—on the automatic machine. This method gave much finer, and *completely uniform* finishes on the company's locks.

3 RESULTS:
An immediate increase in production at lower unit costs because belts are not only faster-cutting but longer-lasting—thus helping cut costly down-time. A 3M Representative can help solve *your* grinding and finishing problems, too. Call him today . . . no cost or obligation.

3M ABRASIVES

WANT MORE INFORMATION?

Minnesota Mining and Mfg. Co.
Dept. GJ-85, St. Paul 6, Minn.

☐ Send me free booklet: "Grinding and Polishing Hardware"
☐ Please have 3M Representative call

NAME..... TITLE.....
COMPANY.....
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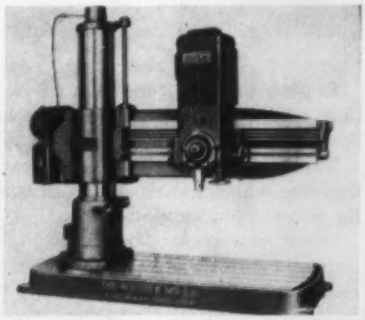
MY DISTRIBUTOR IS.....

Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: P. O. Box 757, London, Ontario. Export Sales Office: 99 Park Avenue, New York City. Makers of "SCOTCH" Brand Pressure-Sensitive Tapes, "SCOTCH" Brand Magnetic Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing.

against scoring by guards and wipers. Two tables are available: 22 x 44 in. and 22 x 54 in.

Radial Drill—Preselected feeds and speeds are featured. There are 36 spindle speed choices up to 3000 rpm.

Reverse speed is 40 per cent faster than forward to make tapping more efficient. The feed dial is graduated to full spindle travel to eliminate resetting of the dial for deep holes.



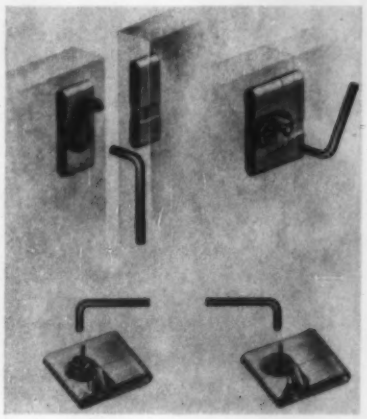
A counterbalance produces equal tension on the spindle whether it is extended or close to the head.

The machines are available with 4 to 8-ft arms and 13 to 19-in. columns.

Other new machines: A jig grinder and a radial drill layout unit. *Write*: Fosdick Machine Tool Co., Cincinnati, O. *Phone*: Kirby 1-4545

Structural Fastener

Here is a high-load, positive-locking fastener for panels on demountable buildings, shipping containers, aircraft cowlings, guided missile assemblies, sheet metal



You can't beat the combination of the RIGHT horsepower, the RIGHT shaft speed, the RIGHT features all in one compact power unit that you can use RIGHT where you want it. It's the best way and the easiest way to select your power drives because you purchase one unit, handle one unit in your receiving, production, or maintenance departments . . . set one unit in place and you're ready to go.

Master Motors, available in thousands and thousands of ratings (1/8 to 400 HP) give you the widest selection of electric motor drives in the nation . . . permit you to use a power drive that will add greatly to the compactness, appearance, safety and economy of each of your applications.

Use Master Motors to increase the salability of your motor-driven products . . . improve the economy and productivity of your plant equipment. They're the horsesense way to use horsepower.

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO

easy solution

MASTER

ELECTRIC MOTORS

Joliet washers

world's foremost producer of flat washers

JOLIET WROUGHT WASHER CO. • JOLIET, ILLINOIS

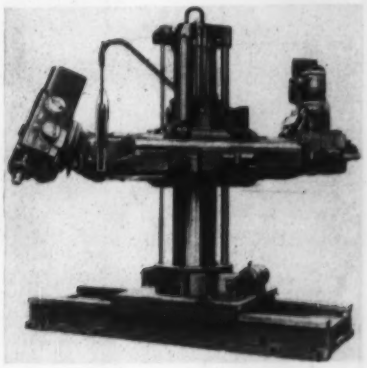
guards and partitions. It's easily installed and can be mounted by recessing in panels or can be surface mounted on sheets, panels or assemblies.

A trigger action gives full open and closed positions. There is no chance of a semiclosed fastener.

Vibration and impactproof, the unit gives a pressure-tight seal when gaskets are used. It will stand 7000-lb tension. *Write*: Simmons Fastener Corp., 1700 N. Broadway, Albany 1, N. Y. *Phone*: 4-6666

Radial Drilling Machine

This new compact unit features compound headstock swiveling which gives it versatility for conventional radial drilling and horizontal, angular and compound drilling.



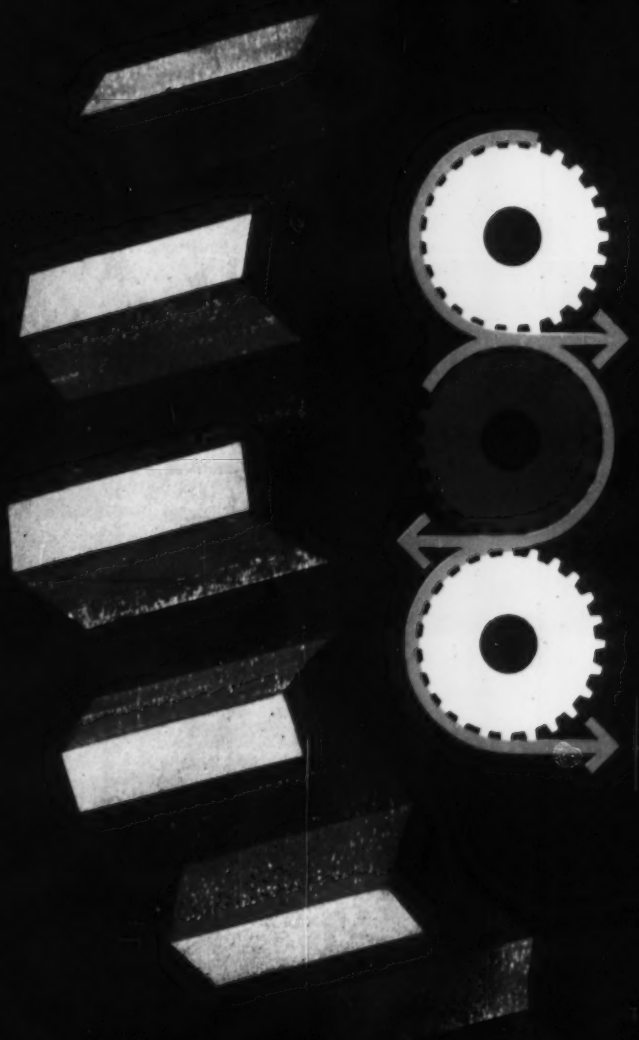
A preselect, automatic, speed-shifting mechanism is controlled from the pendant station. Electric column clamping, power traverse at 80 in. per minute and electrical positioning control on all machine movements facilitate handling. *Write:* Kaukauna Machine Corp., Kaukauna, Wis.

Tractor Shovel

This four-wheel-drive tractor has a capacity of 2 cu yd. A clutchless transmission adds to its speed and productive capacity. Models have either gasoline or diesel power.

Pry-out bucket action uses breakout pads on the ground as a fulcrum. Opposing load forces are transferred to the ground instead

4150 steel is your best bet for heavy sections



Chromium Molybdenum Steel like AISI-SAE 4150 is the most economical way to uniform properties throughout heavy sections. For heavy duty gears — for shafts — wherever toughness and fatigue strength are important, *plentiful* 4100 Moly steels are better. We will prove it. Climax Molybdenum Company, 500 Fifth Ave., New York 36, N. Y.

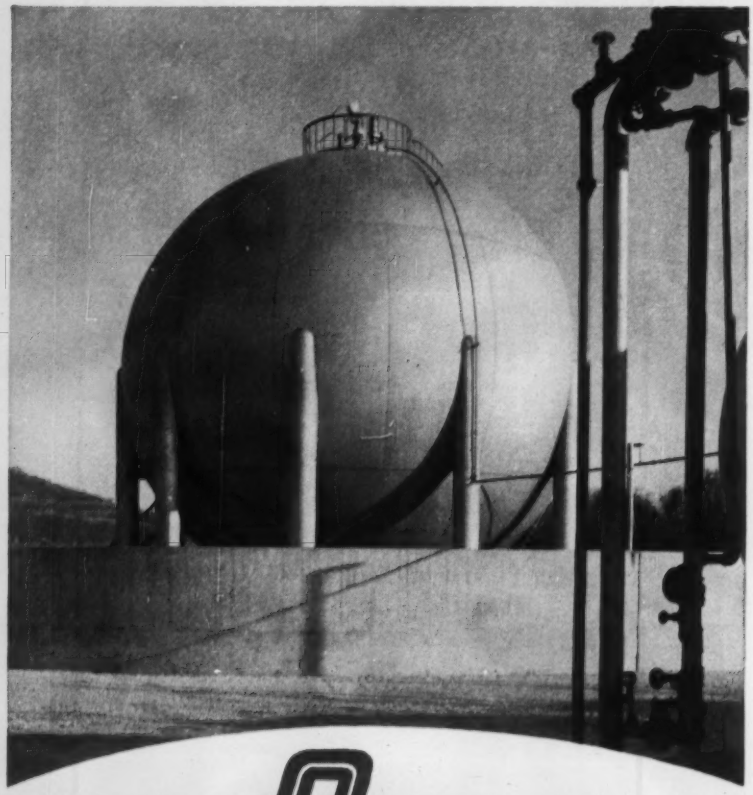
AISI-SAE 4150

C	Mn	Pmax	Smax
0.48/0.53	0.75/1.00	0.040	0.040
Si	Cr	Mo	
0.20/0.35	0.80/1.10	0.15/0.25	

4100 steels are your best bet

CLIMAX MOLYBDENUM

For speed, economy and dependability when welding low-alloy steels...



WELD WITH ARCOS

LOW HYDROGEN ELECTRODES

When welds *must be strong*—as in the Hortensphere* pictured above—ARCOS Low Hydrogen Electrodes will do the job. Usable in all positions, they produce uniformly high quality welds to meet the most rigid inspection standards. Time and money will be saved by eliminating preheat and by avoiding costly repair welds. ARCOS CORPORATION, 1500 South 50th St., Philadelphia 43, Pa.

*Trademark registered by Chicago Bridge & Iron Co.

NEW PRODUCTS and equipment

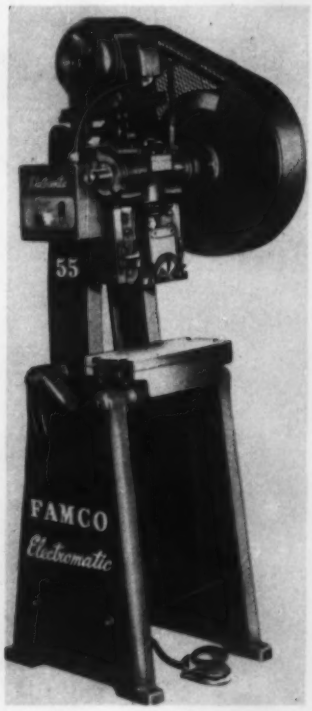
of to the axles, wheels and hydraulic system.

Other features: Sealed, pressure-controlled hydraulic system; torque converter; double-acting hydraulic

rams with chrome-plated piston rods; vacuum-boosted, four-wheel brakes; power steering; and a 12-volt battery system on the gasoline-powered model. *Write:* Frank G. Hough Co., 876 Seventh St., Libertyville, Ill. *Phone*: 2-4000

10-Ton Power Press

This standard, open-back inclinable press has a 1¼-in. standard stroke and operates at 190 strokes per minute. A ¾-hp motor runs at 1200 rpm.

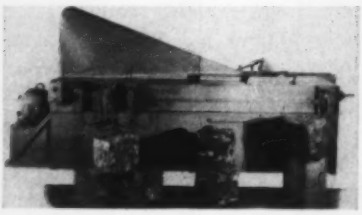


Improved features include extra long ramways, increased ram adjustment, greater ram area, preci-

sion fitted ram block, a one-piece heat treated crankshaft and a close-grained cast frame. *Write:* Famco Machine Co., 3100 Sheridan Rd., Kenosha, Wis. *Phone:* Olympic 4-3516

Scrap Metal Baler

Portable and hydraulic, this unit compresses the contents of an 8-cu-ft charging compartment into a 1-cu-ft briquette. Briquettes will weigh up to 120 lb, depending upon the material.

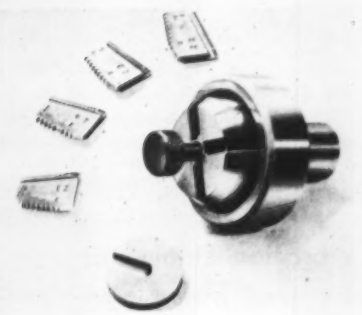


The charging door, bale ejector and bale compressing ram are all hydraulically operated.

Light gage scrap and trimmings, ferrous or nonferrous, up to 54 in. can be baled. The baler is powered by a 5, 7½ or 10-hp motor. *Write:* Balemaster Division, East Chicago Machine Tool Corp., 4801 Railroad Ave., East Chicago, Ind. *Phone:* 7470

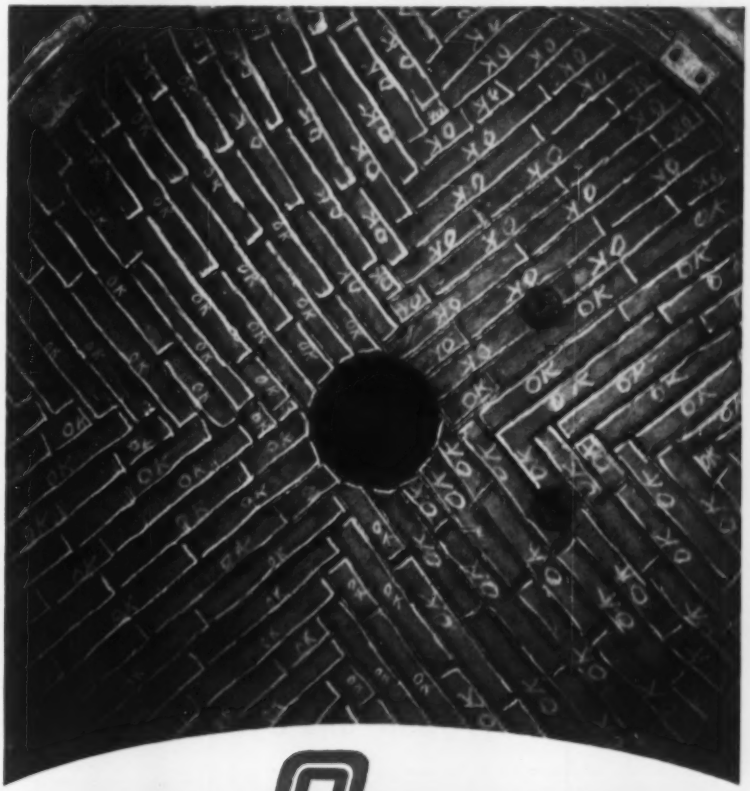
Tap Chasers Relieved

One grinding operation and this new attachment for the universal form relieving fixture are all that's needed for radial relieving of a set of collapsible tap chasers.



The attachment is a head with slots in which the chasers are inserted. They are secured with a C-washer tightened with a knurled

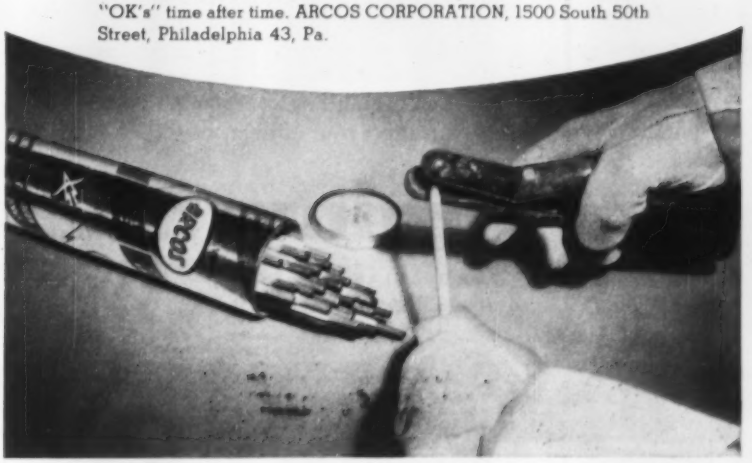
How to get the "OK" on stainless welds . . . time after time

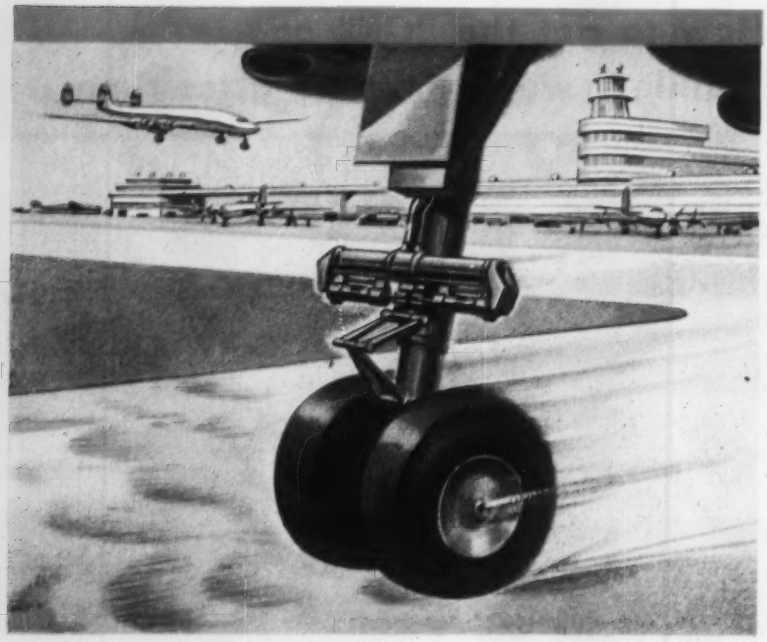


WELD WITH ARCOS

STAINLESS ELECTRODES

On weld after weld—such as in this refinery tower lining which must resist intense corrosion—Arcos quality controlled electrodes will give you the "right" weld metal . . . easily deposited. If you are looking for sound, low cost, long-life welds—you can rely on Arcos *ELECTROPAKED* Electrodes to produce unquestioned "OK's" time after time. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.





60 tons kiss the runway at 120 miles per hour

... safely, again and again, on forged landing gear parts

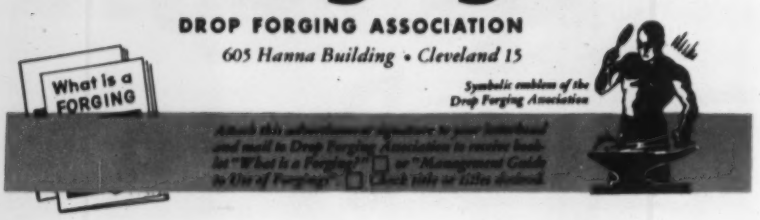
You've seen big planes, weighing 60 tons or more, landing at speeds up to 120 M.P.H. Landing gear assemblies, essential to this remarkable performance, are made with *forgings* as key components.

Have you thought what this means to your product, your process? Forgings can be trusted in such critical applications because they are sound. That same soundness of forged parts can be useful to you in reducing the cost of equipment you make or use. The soundness of forgings can reduce your costs for inspection, for machining, for rejections, for replacement of faulty parts, and other expenses. Ask us to send you the booklets named below, which explain these advantages and tell you how to get a Forging Engineer's help in determining how forgings can affect your ultimate costs.

closed-die forgings for metal you can trust

DROP FORGING ASSOCIATION

605 Hanna Building • Cleveland 15



Symbolic emblem of the Drop Forging Association

Attach this advertisement or signature to your letterhead and mail to Drop Forging Association to receive booklet "What is a Forging?" ☐ or "Management Guide to Use of Forgings" ☐ Check title or titles desired.

NEW PRODUCTS and equipment

screw. The assembly is then put in a collet and ground as if it were a solid tool.

Life of the blades is multiplied because all chasers have identical chamfer, and each does its share of cutting. *Write:* Royal Oak Tool & Machine Co., 29800 Stephenson Highway, Royal Oak, Mich. *Phone:* Lincoln 1-1080

Elevating and Dumping

This automatic mechanism can be used in any process requiring top loading of bins, furnaces or other receptacles. It lifts and dumps up to 800 lb.

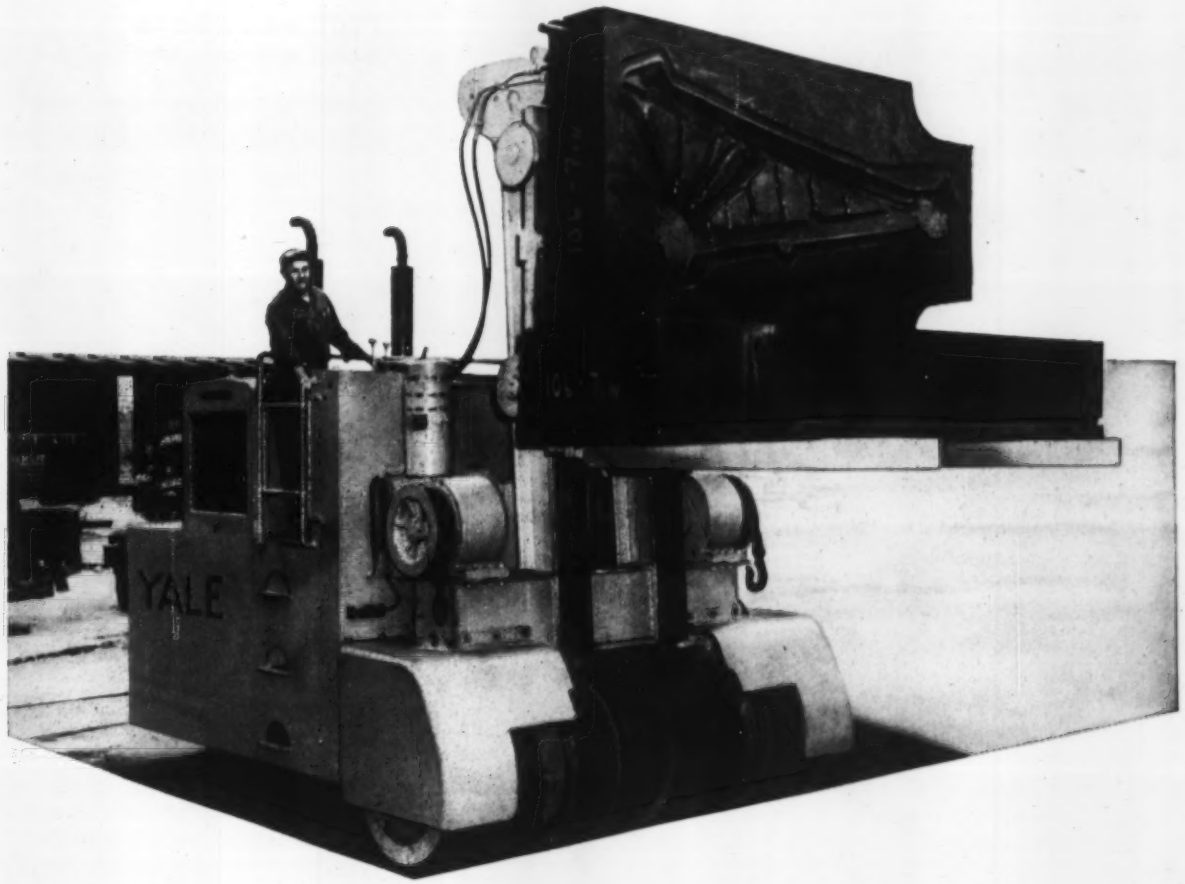
Lift of the unit is 4 ft; installation space needed is 30 x 30 in.

The elevator can load conveyors, hoppers or bins. A cycle takes less than 30 seconds. *Write:* Nolan Corp., Rome 2, N. Y.

Vibration Eliminator

This unit is used to meet problems in piping systems in communities subject to earthquakes.

The eliminators are 6 ft long. Four springs mounted on a 2⅜-in. rod will absorb two-directional



Mammoth dies no match for 80,000 lb. Yale Electric Truck

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YALE industrial trucks meet *every* handling need—give you *more* for your truck dollars at the same time! For heavy jobs—such as handling multi-ton dies quickly, surely—or for routine materials handling in every phase of automobile production, YALE makes a complete line of Electric and Gas Trucks . . . with exclusive features that (1) cut direct handling costs more; (2) cut *hidden* costs, too, by protecting operators from handling shocks which cause fatigue, impair efficiency.

YALE Gas and Electric Truck exclusives: hypoid gears, inclined ring pins, rolled lift channels, spline drive shaft—*plus* famous Fluid Coupling on YALE Gas Trucks. Whether Gas or Electric, you'll find that YALE Industrial Trucks provide smoother operation, easier handling—with minimum downtime. Get full facts today!

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WITH "ALODINE"®

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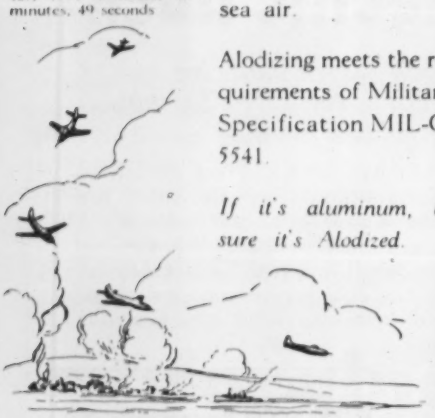
Navy LCdr Francis X. Brady with Cougar in which he broke transcontinental flight record April 1st, 1954—3 hours, 46 minutes, 49 seconds

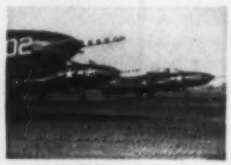
The terrific speed of the GRUMMAN Cougar and its severe service requirements make surface protection of its aluminum components a "must." "Alodine" provides a durable paint bond, in addition, it protects the aluminum against corrosion, especially when exposed to sea air.

Alodizing meets the requirements of Military Specification MIL-C-5541.

If it's aluminum, be sure it's Alodized.

Snow-covered Panther Jets on flight deck of USS Philippine Sea prior to take-off.





Panther Jets on run-ways.

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY

AMBLER, PA.

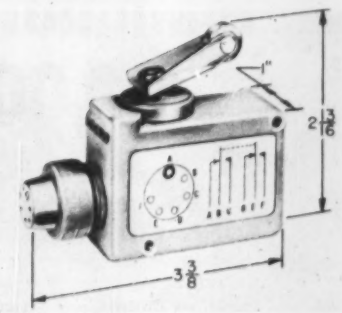
DETROIT, MICH. NILES, CALIF. WINDSOR, ONT.

NEW PRODUCTS and equipment

lateral shocks. A pressure of 735 lb per inch of travel is required to compress or expand the springs. The unit is swivel mounted to accommodate motion in other planes. *Write:* Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa. *Phone:* Atlantic 1-5700

Microswitches

Environment-proof limit switches are completely sealed. They contain an inert gas to prevent their operation from being affected by atmospheric changes or severe conditions.

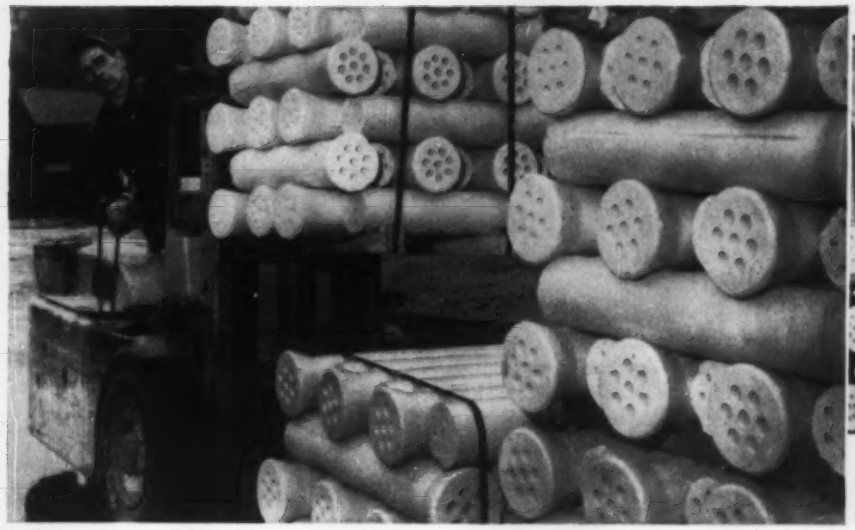


The switches are light. Either side or bottom-mounting designs are available in a variety of electrical rating and circuitry selections. They meet vibration, shock-resistance and immersion tests. *Write:* Micro Switch, Division of Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Pulsation Absorber

This simple piston device will reduce vibration and pounding in suction and discharge lines of pump installations as much as 75

USS Gerrard ties ANYTHING you've ever seen



A fork lift truck drives right into the kiln, picks up the pallet and takes it to the railroad car or to the warehouse. No manual handling is necessary.

The 50-pound tuyeres are palletized right in the kiln. They are stacked 42 to a pallet, and bound with two loops of ¾" x .035" USS Gerrard Flat Steel Strapping.

"USS Gerrard Steel Strapping has saved money in loading, storage, breakage and man-hours not only for us but for our customers as well"

Says Climax Fire Brick Co. • Climax, Pennsylvania

In 1949 the Climax Fire Brick Company turned to USS Gerrard for the best method of handling and shipping odd-size fire bricks, known as tuyeres. Here are the results:

- By using USS Gerrard Flat Steel Strapping they reduced their shipping damage to *less than 1%!*
- Since they can safely stack the Gerrard-palletized tuyeres much higher, they have *increased their storage space by 33%!*
- Loading and moving the tuyeres by hand used to require 8 hours to fill a normal freight car with 2200 units. Using the Gerrard system, it now takes only 2 hours—*a savings of 75% in man-hours alone!*

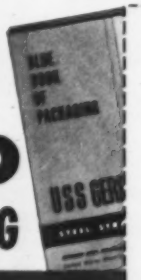
The tuyeres are used exclusively in the Bessemer Furnace. When fitted together in the furnace, they form a series of continuous holes through which highly compressed air is forced into the molten steel for the purpose of blowing out impurities. Climax Company produces 60% of the nation's tuyere requirements.

It's time for you to try USS Gerrard Steel Strapping — both Round and Flat. Whatever your packaging-tying problem might be, our engineers can help you find the safest, most economical solution. Contact us at your convenience. Meantime, send for your free copy of the new GERRARD Blue Book of Packaging.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL CORPORATION
General Offices: Chicago, Illinois

USS GERRARD STEEL STRAPPING
Round and Flat

UNITED STATES STEEL



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per cent. Recurrent, momentary shock pressures are dampened immediately without reducing operating capacity.

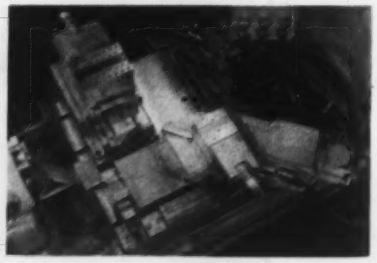
The absorber is easily installed on existing pumping equipment by a simple change in housings. No piping need be changed. *Write:* Tri-Rotor Pump Dept., Yale & Towne Mfg. Co., Stamford, Conn. *Phone:* Davis 4-3121

Chucking Lathe

Here is a high-production machine for first and second operation work. It has automatic cycle control of all cutting tool movements. Swing over the front slide is 15 in., over the rear slide, 13 in.

Both slides are hydraulically actuated. The front slide is used for facing and contour turning or boring. The rear slide does necking and grooving.

There are three factory installed speed ranges; top speeds are 900,



1850 and 2700 rpm. *Write*: Monarch Machine Tool Co., Sidney, O. *Phone*: 2-1381

Turret Lathe

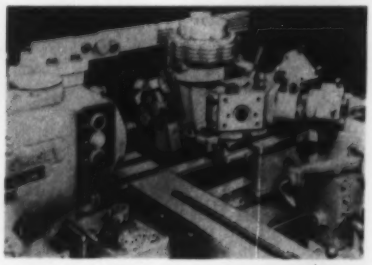
Controls for the headstocks and other machine functions are grouped to increase production by decreasing operator effort.

The headstock has 16 spindle speeds. One handle controls the electric clutch as well as speed changing. Speeds are preselected, and correct cutting speeds determined by a large dial.

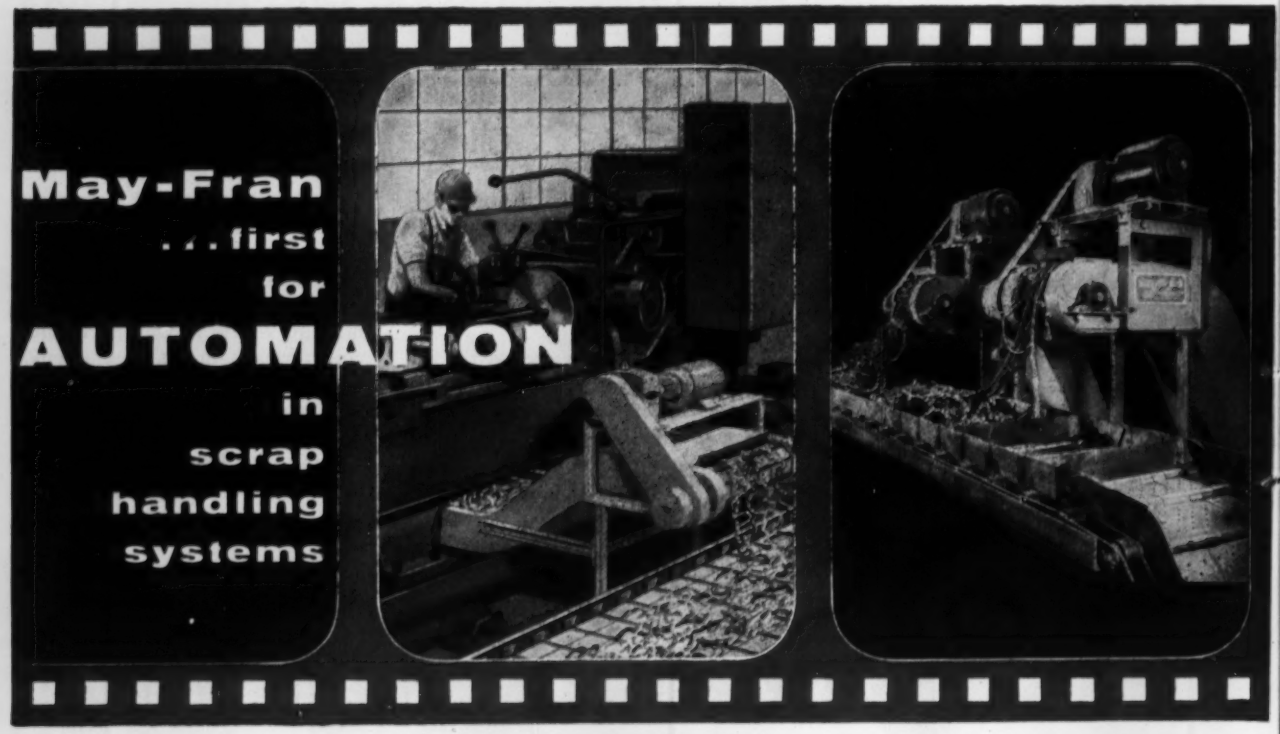
Twelve feed changes are provided for the turret slide and carriage. Feed changes in each apron are made with a single lever. Positive feed clutches make heavier cuts possible. *Write*: Bardons & Oliver Inc., W. Ninth St. & Olive Ave., Cleveland, O. *Phone*: Main 1-0197

Bar turner

This turner for stepped shafts uses one cutter and is limited in cutting length only by the ram travel of the turret lathe. It permits up to five diameters to be preselected and turned in a range from 1/16 to 1½-in.



The step turner uses a cutter holder mounted on an arm controlled by four preset micrometer dials at the top of the attachment. *Write*: Warner & Swasey Co., 5701 Carnegie Ave., Cleveland, O. *Phone*: Henderson 1-5580



The CHIP-TOTE conveyor permits complete utilization of machine tools by eliminating shut-down for manual scrap removal.

It handles a continuous flow of hot, wet or dry chips, turnings and borings from any multiple spindle automatic machine.

NEW literature

Write directly to the company for a copy

Propeller Fans

Specifications, dimensions and performance figures are given on 18 types of industrial ventilating fans, plus intake units, unit heaters and accessories — catalog A-109A, 40 pages.

Roof ventilators also are described —bulletin A-112, 12 pages. Hartzell Propeller Fan Co., Piqua, O.

Vacuum Pumps

Rotary gas ballast pumps are depicted—bulletin P-3, Naresco Equipment Corp., 160 Charlemont St., Newton Highlands 61, Mass.

Spring Design

Data sheets give basic considerations in designing precision springs—8 pages. Engineering Dept., Hunter Spring Co., Lansdale, Pa.

Rail Car Switcher

Features of the unit and the weight transfer principle are described—6 pages. Hemco Mfg. Inc., Argonia, Kans.

Equipment Catalog

Rotary burs and files, flexible shaft units, mounted grinding points and electric motor maintenance tools are listed—64 pages. Martindale Electric Co., Box 617, Edgewater Branch, Cleveland 7, O.

Xerography

Case history tells how report writing costs and duplicating time were cut—4 pages. Dept. WS-1, Haloid Co., Rochester 3, N. Y.

Stainless Steel Handbook

Design, properties, specifications and applications are given—36 pages. Alloy Metal Wire Division, H. K. Porter Co. Inc., Prospect Park, Pa.

Compressors

Feather valve units are from 75 to 350 hp —bulletin L-676-B1A, 32 pages. Advertising & Sales Promotion Dept., Worthington Corp., Harrison, N. J.

Friction Clutch

Power transmission applications are met by this clutch—book 2637, 8 pages. Dept. PR, Link-Belt Co., 307 N. Michigan Ave., Chcago 1, Ill.

Rubber-Phenolics

Design file gives the latest uses in electrical equipment, appliances, electronics and machinery—25 case histories. Chemical Materials Dept., General Electric Co., Pittsfield, Mass.

Cutting Fluid

Machining and grinding procedures with the use of coolants are described—56 pages. Master Chemical Corp., 13 Huron St., Toledo 1, O.

Flexible Shaft Machines

Attachments, accessories and machines are described and illustrated—circular 580, 24 pages. Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn.

Stainless Castings

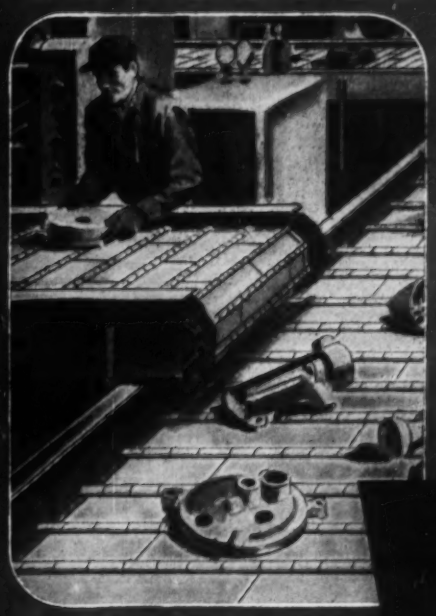
Applications in food processing equipment, standard designations and chemical composition ranges are given—6 pages. Alloy Casting Institute, Mineola, N. Y.

Strapping Machines

Automatic steel strapping of cartons, boxes, bundles and coils is shown—4 pages. Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47, Ill.

Architectural Aluminum

Sizes, weights, alloys and tempers of items available from warehouse



Now is the time to put AUTOMATION to work . . . Now is the time to cut production costs . . . May-Fran engineers design and build complete scrap handling systems for the automatic removal of machine turnings or chips. May-Fran conveyors will transmit scrap to ultimate point of disposal.

Press Scrap systems can be made completely automatic. Hinged-steel belt will take scrap from presses, handle it through blanking, shearing, forming and baling processes, and deliver it to rail cars.

May-Fran is prepared to engineer, fabricate and install complete conveyor systems to your specifications.

Write today for complete information on how an automatic scrap removal system will cut your production costs.

Bulletin MF-530 describes the new Hinged-Steel conveyor belt.

Bulletin MF-640 describes the Chip-Tote conveyor which removes scrap from operating machines.

DESIGNERS AND ENGINEERS OF COMPLETE SCRAP HANDLING SYSTEMS

MAY-FRAN ENGINEERING, INC.

Hinged-steel belting handles scrap as well as hot heavy and abrasive castings. Belt is economical . . . maintenance-free.

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CLEVELAND 12, OHIO

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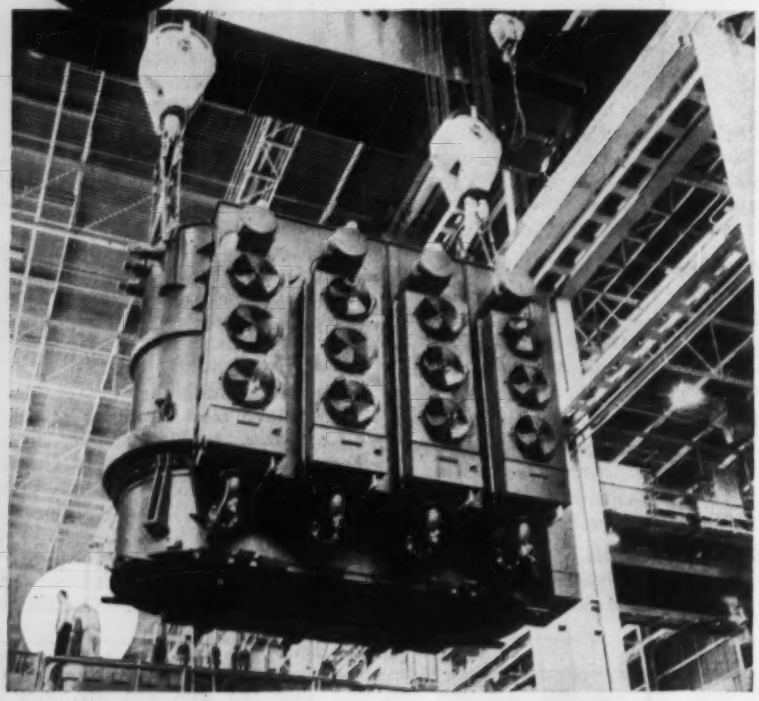

You Can't Afford Not to Use Them!

● Materials handling is ticklish business. A dropped load can mean disastrous financial losses through ruined material and equipment, plus disrupted production schedules.

That's why more and more manufacturers are standardizing on ACCO *Registered* wire rope slings for all lifting operations. For ACCO *Registered* slings incorporate extra safeguards which make them the safest slings available.

Each individual component, made from the highest quality material suited to its use, is tested before assembly—must prove to have strength equal to or greater than the sling body. These components are then assembled into slings according to precisely engineered designs which have proven their safety and reliability in extensive field tests.

Each completed sling is then proof-tested at twice the load-carrying capacity for which it is rated. Then and only then does it receive the coveted registration certificate and tag.

Compare this rigorous quality control, precise design and manufacture, and extensive testing with the necessarily hit-or-miss methods used in producing "home-made" or hand-assembled slings. You'll see why ACCO *Registered* wire rope slings are safer.

And ACCO *Registered* slings cost less to use. Carefully engineered and precisely manufactured, they last longer, reduce overall lifting costs.

Get the details on ACCO *Registered* wire rope slings from your distributor, or call the nearest ACCO district branch below.

FREE SLING NOTEBOOK
Fifty-six page booklet includes data on sling use, tips on sling care, rated capacity information on all types of wire rope slings. *Write today for your copy.*

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Better Value

NEW LITERATURE

stocks are listed in portfolio—202 pages. Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.

Blast Cleaning

Pressure blasting in a confined area and the machines that do the work are shown—4 pages. Vacu-Blast Co. Inc., P.O. Box 885q, Belmont, Calif.

Air-Line Lubricators

Here is how to prevent air tool failures caused by lack of lubrication—form 4169, 8 pages. Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

Hydraulic Transmission

Variable speeds and other features of the unit are given—catalog section T-100, 4 pages. Gerotor May Corp., Maryland Ave. & Oliver St., Baltimore 3, Md.

Milling Attachment

Quill-type attachment described is suited for milling, boring, drilling, reaming and grinding operations. Axelson Mfg. Co., Los Angeles 58, Calif.

Plating Solution Heaters

Described are a wide range of electric heaters for cleaning, pickling and plating solutions — bulletin 750, 4 pages. Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

Vacuum Melting

Metallurgy and product design of vacuum melted alloys are covered—8 pages. Metals Division, Utica Drop Forge & Tool Corp., Utica 4, N. Y.

Gears

Gear making, testing and design are explained with photos, graphs and tables—44 pages. Sier-Bath Gear & Pump Co. Inc., 9252 Hudson Blvd., North Bergen, N. J.

Plating Tanks

Instrumentation for temperature control in several types of plating tanks is described—data sheet 5.1-4, 8 pages. Minneapolis-Honeywell Regulator Co., Industrial Division, Wayne and Windrim Ave., Philadelphia 44, Pa.

Arc Welding Equipment

Manual and automatic inert gas, shielded metal, arc welding equipment, accessory apparatus and welding wire are featured—catalog 2350, 16 pages. Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.

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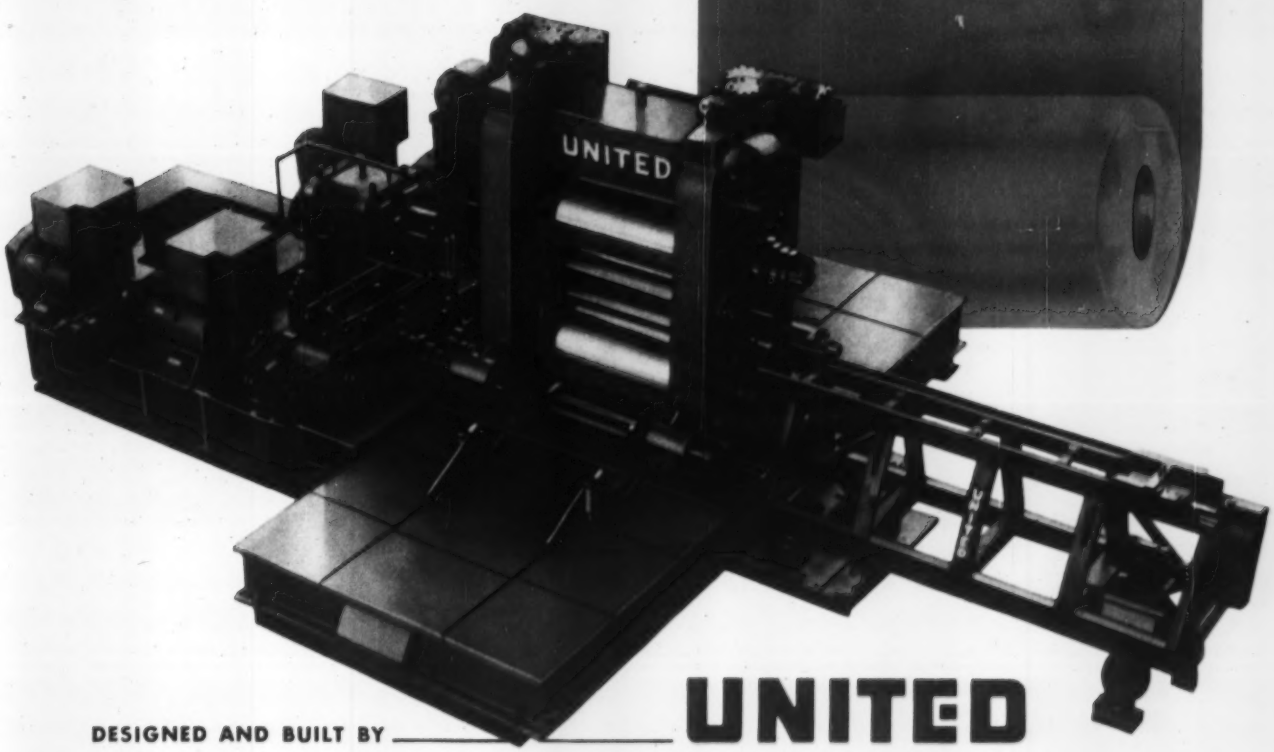
ALUMINUM FOIL MILL



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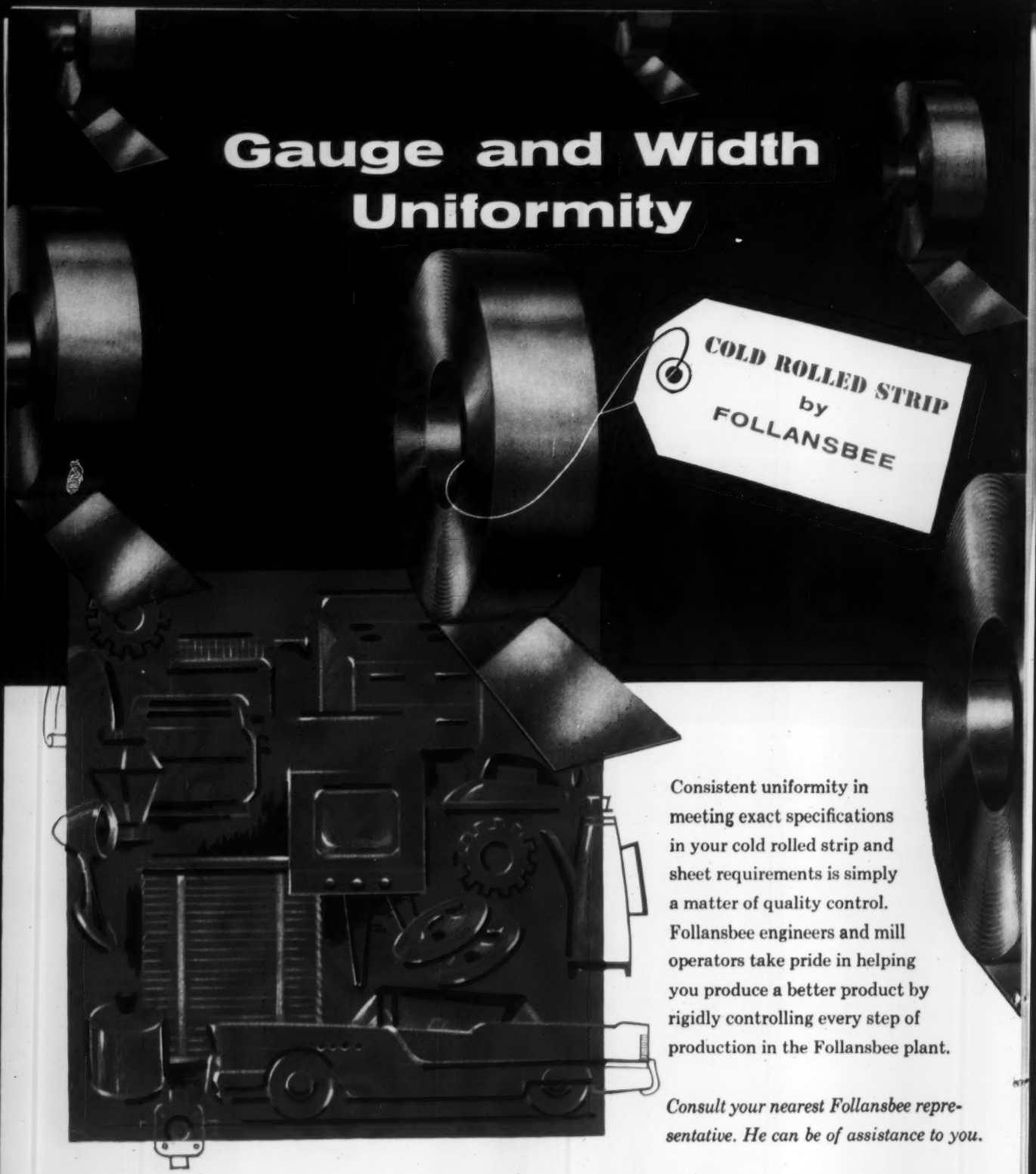
ENGINEERING AND FOUNDRY COMPANY
Pittsburgh, Pennsylvania

Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

Plants at: Pittsburgh • Vandergrift • Youngstown • Canton
Wilmington (Lobdell United Division)

Subsidiaries: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Co., Inc., Aurora, Ind.

Gauge and Width Uniformity



Consistent uniformity in meeting exact specifications in your cold rolled strip and sheet requirements is simply a matter of quality control. Follansbee engineers and mill operators take pride in helping you produce a better product by rigidly controlling every step of production in the Follansbee plant.

Consult your nearest Follansbee representative. He can be of assistance to you.

FOLLANSBEE

STEEL CORPORATION

FOLLANSBEE, WEST VIRGINIA

Cold Rolled Strip • Seamless Terne Roll Roofing • Polished Blue Sheets and Coils

Sales Offices in Principal Cities

STEEL

August 15, 1955

Market Outlook

STEEL INVENTORIES are beginning to get more than the usual amount of attention.

Steel producers are watching them for clues on the outlook for steel demand in the next several months, and they are studying ways to reduce inventory build-up during periods of high consumption.

A BUILDUP—STEEL estimates that consumers began building steel inventories in March and that they continue to do so. One piece of evidence is a report from the automobile industry—the biggest single user—that steel is not regarded as a short material. Although automakers are in a seasonal downturn in production, they are making no important cancellations or setbacks in steel orders.

PATTERN OF ACTION— Automakers and other consumers will continue to take in all the steel offered them as long as deliveries remain as extended as they are. When consumers think their inventories are large enough, they'll reduce their ordering. That will shorten deliveries. When consumers can get steel quickly, they will not have the urge to order more than they consume.

More evidence that the steel supply is ample for consumption is that no one's saying he'll have to close for want of steel. While consumers are taking all the steel offered them, they aren't pressuring producers for immediate delivery like they were in 1951 and 1952. Also absent are the conversion deals and gray market prices of those periods.

ON GUARD—The inventory build-up is not alarming at this point, for it has gone on only five months, and some build-up was necessary to support the increased rate of consumption. Steel producers know inventory accumulation won't continue forever. What they're watching for is a turning point.

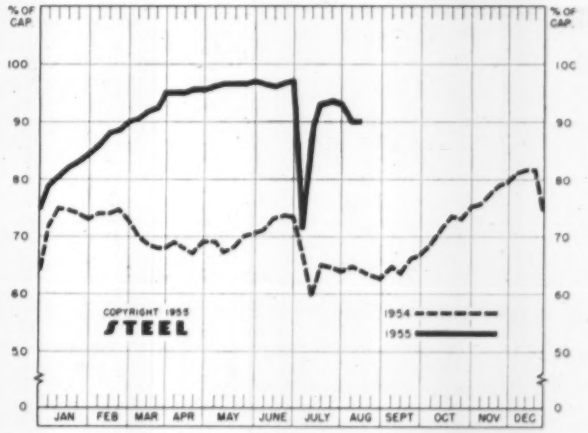
The steel inventory build-up has come about not because of a reduction in consumption, although July consumption is off a little from some of the preceding months this year, but because of substantial increases in steel shipments from mills.

If the government's move to tighten credit is effective, it probably will lower demand for things made of steel—and ultimately reduce the demand for steel.

THE BIND— The thing that bothers steel producers about inventories is that consumers want to build up their stocks when consumption is rising or high. One steel producer studying this problem points out that the industry could serve a lot more customers with its present capacity if it didn't have to build surplus inventories at the peaks. To cut in half the violence of inventory building and reduction would save billions of dollars of capital expansion and help mightily to smooth out mill production and employment curves, the company says. That company reveals it has been experimenting with various solutions during the present inventory accumulation and that results are encouraging.

OUTPUT—Steel production holds steady at 90 per cent of capacity. That rate is lower than the second quarter average of 95.2 per cent. The drop results from summer vacations, hot weather, furnace repairs and labor troubles.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Aug. 14	Change	Same Week 1954	Same Week 1953
Pittsburgh	97.5	+ 3.5*	62	93.5
Chicago	94.5	+ 3.5*	69	104
Mid-Atlantic	94	+ 1	57	96
Youngstown	100	+ 5	65	103
Wheeling	97.5	0	78	95.5
Cleveland	98.5	+ 2*	61	102.5
Buffalo	105	0	56	106.5
Birmingham	23	+ 2	64.5	94.5
New England	86	+ 3	55	90
Cincinnati	88	+ 3	54.5	91
St. Louis	98	— 5.5	54.5	103
Detroit	88.5	+ 2	56.5	108
Western	103	+ 1	83	102.5
National Rate	90	0	64	96

INGOT PRODUCTION‡

	Week Ended Aug. 14	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	90.8†	86.9	91.2	64.0
NET TONS (In thousands)	2,192†	2,098	2,202	1,525

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 77

Technical Outlook—p. 133

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Aug. 9 1955	Aug. 2 1955	Month Ago	July Average
(1947-1949=100)	153.9	153.9	153.8	153.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 9

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.200
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	7.993
Tie Plates	5.625	Strip, C.R., Stainless, 430 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.350
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.366
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	19.971
Structural Shapes	4.867	Pipe, Line (100 ft)	158.925
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical Stainless, 304 (100 ft)	180.952
Bars, H.R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.533
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.233
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.333
Bars, C.F., Carbon	8.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless, 430 (lb)	0.578
Bars, C.F., Stainless, 302 (lb)	0.468	Bale Ties (bundle)	6.473
Sheets, H.R., Carbon	5.145	Nails, Wire, 8d Common	8.618
Sheets, C.R., Carbon	6.239	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Aug. 10 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	207.63	207.63	207.63	194.19	156.99
Index in cents per lb	5.625	5.625	5.625	5.261	4.253

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$127.41	$127.41	$118.45	$117.77	$94.50
No. 2 Fdry, Pig Iron, GT	58.99	58.99	56.54	56.54	46.85
Basic Pig Iron, GT	58.49	58.49	56.04	56.04	45.97
Malleable Pig Iron, GT	59.77	59.77	57.27	57.27	47.49
Steelmaking Scrap, GT	44.17	42.83	35.00	28.50	38.58

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Aug. 10 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.45
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.45
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	3.93
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.10-4.15
Shapes Std., Pittsburgh	4.60	4.60	4.60	4.25	3.40
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.40
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.42
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.50
Plates, Chicago	4.50	4.50	4.50	4.225	3.50
Plates, Coatesville, Pa.	4.50	4.50	4.50	4.225	3.60
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.50
Plates, Claymont, Del.	4.50	4.50	4.50	4.225	3.60
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.35
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.35
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.425	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.40
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.425	3.50
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.25
Strip, C.R., Pittsburgh	6.317	6.317	6.317	5.75	4.15-4.50
Strip, C.R., Chicago	6.35-6.45	6.35-6.45	6.45-6.55	6.00	4.30
Strip, C.R., Detroit	6.35	6.35	6.35-6.55	5.90	4.35-4.95
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.50
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.30
Tin plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.50

SEMIFINISHED STEEL

Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$63.00
Wire rods, 7/32-5/8" Pitts.	5.025	5.025	5.025	4.525	3.85

PIG IRON, Gross Ton

Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$48.50
Basic, Valley	58.50	58.50	58.50	56.00	46.00
Basic, deld. Phila.	56.16	56.16	56.16	59.66	50.39
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	46.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	46.50
No. 2 Fdry, deld. Phila.	59.66	59.66	59.66	60.16	50.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	42.38
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.43	49.08
Malleable, Valley	59.00	59.00	59.00	56.50	46.50
Malleable, Chicago	59.00	59.00	59.00	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	19.00†	200.00†	175.00*

75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$44.50	$43.00	$39.50	$28.50	$41.00
No. 1 Heavy Melt, E. Pa.	46.00	44.50	39.50	24.50	36.75
No. 1 Heavy Melt, Chicago	42.00	42.00	37.00	29.00	38.00
No. 1 Heavy Melt, Valley	46.50	46.50	38.50	26.50	43.25
No. 1 Heavy Melt, Cleve.	44.00	44.00	35.00	24.50	40.75
No. 1 Heavy Melt, Buffalo	39.50	39.50	34.50	26.50	36.75
Rails, Rerolling, Chicago	64.50	64.50	57.00	43.50	56.50
No. 1 Cast, Chicago	45.50	45.50	43.50	35.50	49.00

COKE, Net Ton

Beehive, Furn, Connisvl.	$13.625	$13.75	$13.75	$14.75	$14.25
Beehive, Fdry, Connisvl.	16.50	16.75	16.75	16.75	15.50
Oven, Fdry, Chicago	25.75	25.75	24.50	24.50	21.00

Daily Nonferrous Price Record

	Price Aug. 10	Last Change	Previous Price	July Avg.	June Avg.	Aug. 1954 Avg.
Copper	36.00	Mar. 29, 1955	33.00	36.000	36.000	30.000
Lead	14.80	Oct. 4, 1954	14.55	14.800	14.800	13.846
Zinc	12.50	June 16, 1955	12.00	12.250	12.250	11.000
Tin	96.75	Aug. 10, 1955	96.875	97.045	93.668	93.332
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	23.20	Jan. 12, 1955	22.20	23.200	23.200	22.119
Magnesium	28.50	Mar. 21, 1955	27.00	28.500	28.500	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

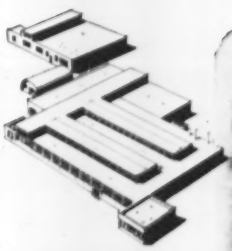
ANNOUNCEMENT!

Teer-Wickwire, manufacturer of precision parts, takes over Lindberg cylinder line

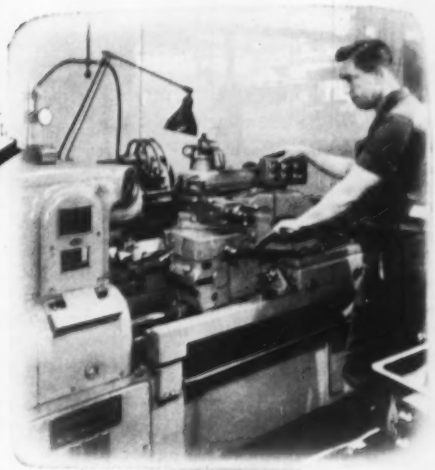
Now Lindberg Air and Hydraulic Division of Lindberg Engineering is Lindberg Air and Hydraulic Division of Teer-Wickwire & Co. Operations have been moved from Chicago to Jackson, Michigan, into a new plant devoted to cylinder manufacture.

Out of this modern 60,000 square foot plant at Jackson will come the present line of Lindberg air and hydraulic cylinders, manufactured to new standards of quality, durability and performance. In development now, and due for release soon, are revolutionary new cylinders to meet tomorrow's requirements with less bulk, less weight, less cost.

WHO IS TEER-WICKWIRE & CO.?



We are specialists in mass production of precision parts and components at low cost. We have been a contract manufacturer for the automotive industry for 25 years. We are *exclusive* suppliers of several components for some of the largest makers. Our plants are tooled with the latest machines. We combine proven production methods with rigid quality control systems to achieve high quality at competitive costs. *All of this experience now goes to work for users of air and hydraulic cylinders!*



The Monarch Tracer-type lathe pictured is typical of the modern machine tools used in our plant.

LINDBERG AIR AND HYDRAULIC DIVISION
TEER-WICKWIRE & COMPANY
Jackson, Michigan

Nonferrous Metals

Anaconda starts producing aluminum at Montana mill and becomes first company to enter field since 1946. All established producers continue to expand

Nonferrous Metal Prices, Pages 190 & 191

ALUMINUM is flowing from a new source, to help ease the shortage. Anaconda Aluminum Co., the first company to enter the aluminum field since 1946, formally opened its $65-million plant at Columbia Falls, Mont., Aug. 15. It will be operating at capacity (120 million lb annually) by Jan. 1, says Russel B. Caples, president.

Each of the 240 pots (two lines) in the four 1180-ft-long pot buildings will produce from 1400 to 1500 lb of aluminum in 24 hours.

Distribution—Production is expected to be divided into four categories. Harvey Machine Co., Torrance, Calif., has an option to purchase. Anaconda Co.'s two fabricating subsidiaries, Anaconda Wire & Cable Co. and American Brass Co., will get a part of their requirements from this plant and a substantial part of the output will be sold on the open market. Anaconda Aluminum is 95 per cent owned by Anaconda Co. and 5 per cent by Harvey Machine Co.

Anaconda Wire & Cable Co., which has five aluminum fabricating mills, already is consuming sizable amounts of the metal for conductors. This company's new aluminum rod-rolling mill at Great Falls, Mont., is almost completely automatic. The firm has started production of aluminum wire and cable in a new building at Sycamore, Ill. When operating at capacity, the new factory will quadruple its output of bare, rubber-insulated and synthetic-insulated aluminum wire and cable.

Site soil tests started in July at Terre Haute, Ind., for American Brass Co.'s $25-million integrated aluminum mill. It is scheduled to be in operation in the fourth quarter of 1956. Production will include the casting of aluminum ingots and billets, rolling of sheet and strip and extrusion of tubes, rods and special shapes. American Brass is producing small quantities of aluminum sheet and strip at its Torrington, Conn., Division.

The Columbia Falls plant uses 120,000 tons of alumina a year. It's shipped from Corpus Christi, Tex., and Hurricane Creek, Ark., plants of Reynolds Aluminum Co.

Anaconda's entry into the field comes at a time when established producers are expanding facilities to meet steadily rising needs.

Reynolds Metals plans were outlined in STEEL, Aug. 8, p. 104. A new $60-million plant is being planned for the New Orleans area by Kaiser Aluminum & Chemical Corp., Oakland, Calif. At the same time, Kaiser has filed for certificates of necessity for a $52-million alumina plant and a $50-million aluminum reduction plant with annual capacities, respectively, of 438,000 and 90,000 tons. Sites for these projects have not been revealed. The company also has filed for a $2.5-million expansion for its reduction plant at Tacoma, Wash.

High Grade Metal—Superpurity aluminum pig, containing 99.99 per cent, or more, aluminum, is being produced in commercial quantities by Kaiser's plant in Mead, Wash. Refining cell facilities were installed recently to provide a larger domestic source for this grade of metal. It previously had been obtained mainly from abroad. The superpurity metal will be rolled into foil at the corporation's Permanente, Calif., plant.

If the government constructs a navigation channel from Aluminum Co. of America's smelting plant at Point Comfort, Tex., to Matagorda bay on the Gulf of Mexico, the Pittsburgh firm will build a $35-million alumina plant near Palacios, Tex. The site is adjacent to Alcoa's Point Comfort smelter, built in 1949. A second Texas smelter, completed in 1954, is at Rockdale.

Expansion completed or in progress since 1950 will raise pig and ingot capacity of the Texas smelters to more than 250,000 tons a year. The proposed alumina plant would have output of at least 500,000 tons initially and a projected capacity of 1 million tons by 1965 to satisfy Alcoa's growing smelter requirements. Two tons of alumina are necessary to make 1 ton of aluminum.

Aluminum Output Up 6 Per Cent

Production of primary aluminum increased more than 6 per cent in the first six months of this year, totaling 759,867 tons. Refiners' stocks at plants totaled only 12,630 tons as of June 30. Shipments of aluminum products increased in June, reports the Aluminum Association, New York. For the first six months of the year, the movement came to 342,942 tons of sheet and plate, 98,918 tons of extruded products, 96,383 tons of castings, 49,379 tons of foil, 44,206 tons of bar and rod and 76,260 tons of other products.

Copper Price Rise Forecast

Shortage of copper continues severe and may force prices of domestically produced metal sharply higher. Predictions of a rise to a 40-cent level are being made in many quarters.

Some brass mills have advanced prices to partially reflect what they are paying for scrap and such raw copper as they are able to purchase. New prices posted by Revere Copper & Brass Inc., New York, are based on copper at 40c, zinc at 13.85c, tin at 97.50c and aluminum at 22.50c.

Government Releases Metal

Release of 5750 tons of copper to those fabricators producing important military items and who might close because of lack of metal has been authorized by the Office of Defense Mobilization. This metal will be withdrawn from the Defense Production Act inventory; none from the national stockpile.

The agency also has released 1 million lb of nickel to industry from scheduled shipments to the government in August. This quantity is over and above 1 million lb previously made available for the same month. This should serve to ease the supply problem resulting from increased industrial demands.

Zinc Demand Remains Active

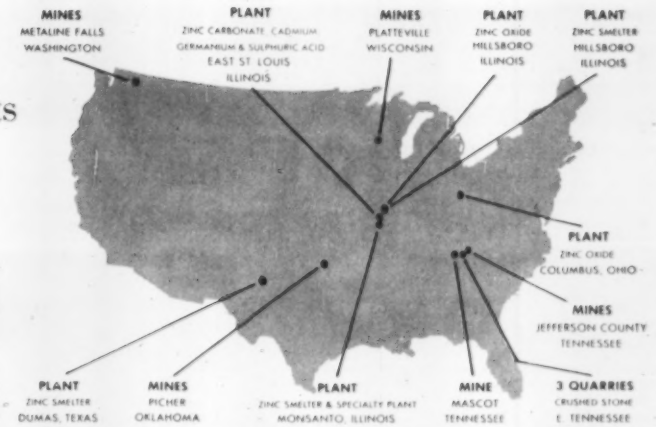
With industrial demand for zinc still active, the government has lightened its "take." In July, only 4039 tons were shipped to the government, compared with 5335 tons in June and 19,694 tons in January, the high for the year to date.

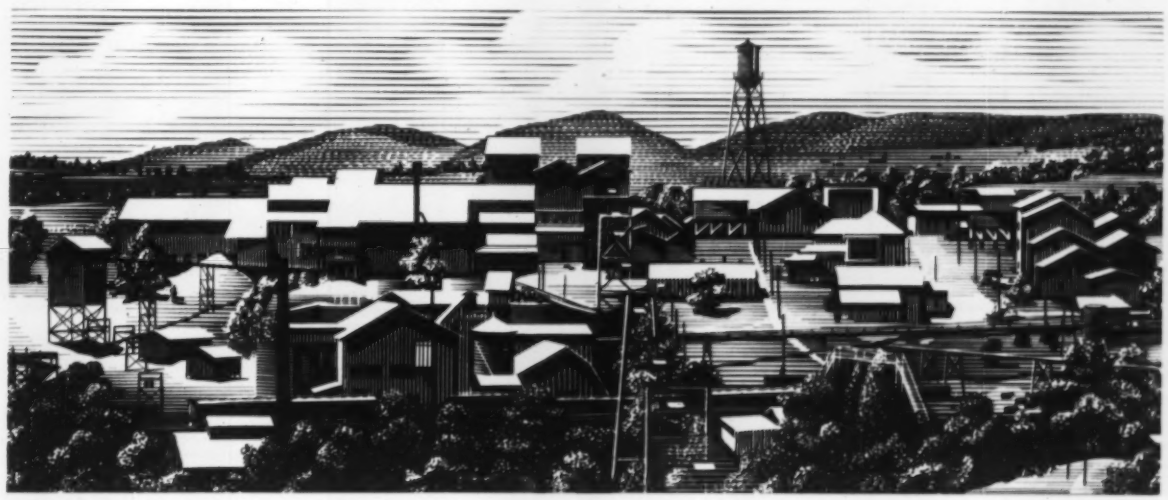
Smelters' stocks are holding at about 51,305 tons, having dropped precipitously from 117,152 tons at the end of January. Their unfilled orders at the end of last month amounted to 64,056 tons.

Domestic mine production of recoverable zinc declined about 2 per cent in June to 43,173 tons. Output for the first six months totaled 256,100 tons, compared with 241,600 tons for the like 1954 period.

American Zinc and its products

from A *to* Z





CONCENTRATING MILL,
MASCOT, TENNESSEE

One of the key factors in American Zinc's widespread mining and milling operations. In Tennessee, American Zinc also owns and operates mines in Jefferson County. It is here that one of the largest known reserves of zinc in the United States is found (in excess of 1,250,000 tons of recoverable zinc, proven, with additional large reserves indicated). Other company-owned and operated mining properties are located at Platteville District, Southern Wisconsin; Metaline Falls District, Eastern Washington; and Picher field of the Tri-State Area (Missouri-Kansas-Oklahoma). For the complete picture, see map above.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

Distributors for

American Zinc sales Company

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50. 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.2; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 27.80; No. 195, 4.5% Cu, 0.8% Si, 27.20; No. 214, 3.8% Mg, 27.7; No. 356, 7% Si, 0.3% Mg, 26.1.

Antimony: R.M.M. brand, 99.5%, 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 36.00 deld. Conn. Valley; 36.00 deld. Midwest; Lake, 36.00 deld; Fire refined, 35.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$100 nom, per troy oz.

Lead: Common, 14.80, chemical, 14.90, corroding, 14.90, St. Louis. New York basis, add 0.20.

Lithium: 99%+, cups or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.ob. Minneapolis, 100 lb lots.

Magnesium: 99.8%, self-palletizing pig, 28.50; notched ingot, 29.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingots; for Los Angeles, add 2.50 for both pig and ingot. Sticks 1.3 in. diameter, 49.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R, 34.00; alloy M, 36.00, 10,000 lb or more,, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.25 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom., per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $80-$85 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $50-$55 per troy oz.

Selenium: 99.5%, $6-$7.25 per lb.

Silver: Open market, 90.75 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 97.625; prompt, 97.625.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.95, grade A-2 (0.5% Fe max), $3.50 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.35-$4.40 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99+% hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 12.50; brass special, 12.75; intermediate, 13.00, E. St. Louis, freight allowed over 0.50 per pound. High grade, 13.85; special high grade, 14.00, deld. Diecasting alloy ingot No. 3, 16.50; Nos. 2 and 5, 17.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50. (Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 31.25-33.00; No. 12 foundry alloy (No. 2 grade), 30.00-30.75; 5% silicon alloy, 0.60 Cu max, 31.00-32.25; 13 alloy, 0.60 Cu max, 31.50-32.25; 195 alloy, 31.25-32.75; 108 alloy, 30.00-30.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 30.50; grade 2, 29.50; grade 3, 28.50; grade 4, 28.00.

Brass Ingot: Red brass, No. 115, 39.75; tin bronze No. 225, 52.50; No. 245, 45.75; high-leaded tin bronze No. 305, 43.00; No. 1 yellow No. 405, 32.75; manganese bronze No. 421, 36.25.

Magnesium Alloy Ingot: AZ63A, 32.00; AZ91B, 32.00; AZ91C, 32.00; AZ92A, 32.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy). Strip, $1.74; rod, bar, wire, $1.71.

COPPER WIRE

Bare, soft, f.ob. eastern mills, 100,000-lb lots, 41.35; 30,000-lb lots, 41.48; l.c.l, 41.98. Weatherproof, 100,000-lb, 40.78; 30,000 lb, 41.03; l.c.l., 41.53. Magnet wire deld., 15,000 lb or more, 48.15; l.c.l., 48.90.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $20 per cwt; pipe, full coils, $20 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $14.00-$14.50; sheared mill plate, $11.00; strip, $14.00-$14.50; wire, $10.00-$10.50; forging billets, $8.75; hot-rolled and forged bars, $8.75.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.00-20.50; plates, 19.00-

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	69	93
Rod, Shapes C.R.	91	75	115
Seamless Tubes	122	108	153
Shot, Blocks		65	

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4		
0.156-0.172	57.5	55.9		
0.188	57.5	55.9		71.7
0.219-0.234	54.5	52.9		
0.250-0.281	54.5	52.9		68.4
0.313	54.5	52.9		65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1		52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9		
1.625-2.000	48.2	46.2		51.9
2.125-2.500	47.0	45.0		
2.563-3.375	45.6	43.6		

ALUMINUM

Sheets and Circles: 110 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	37.5	42.3		
0.135-0.096	38.0	43.2		
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0		39.4	45.4
0.016-0.015	43.9		40.2	46.6
0.014	44.9		41.2	47.9
0.013-0.012	46.1		41.9	48.9
0.011	47.1		43.1	50.5
0.010-0.0095	48.4		44.3	52.2
0.009-0.0085	49.7		45.8	54.3
0.008-0.0075	51.3		47.0	56.1
0.007	52.8		48.5	58.4
0.006	54.4		49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 in. lengths.

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$16.10	2	$ 49.55
1	25.35	4	136.65
1¼	34.30	6	244.90
1½	41.00	8	368.50

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in., 72.20; 1 x 4 in., 67.00. Rod, 1 in., 69.00; lb and over, f.o.b. mill.

Plate: Hot-rolled AZ31, 59.00, 30,000 lb or more, 0.250 in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 62.00, 30,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in., 72.20; 1 x 4 in., 67.00. Rod, 1 in., 69.00; 2 in., 66.50. Tubing, 1 in. OD x 0.065 in., 90.00. Angles, 1 x 1 x ⅛-in., 75.90; 2 x 2 x ⅛-in., 70.00. Channels, 5 in., 70.90. I-beams, 5 in., 70.20.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 17.50-18.00; old sheets, 14.50-16.00; borings and turnings, 10.50-11.00; crankcases, 14.50-16.00; industrial castings, 14.50-16.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.76b	52.36c	....	54.82	32.000	32.000	31.250
Yellow Brass	46.27	37.22d	46.81	49.18	23.875	23.625	22.000
Red Brass, 85%	50.99	50.93	51.53	53.80	28.125	27.875	27.375
Low Brass, 80%	49.75	49.69	50.29	52.56	27.000	26.750	26.750
Naval Brass	43.99	44.30	57.05	53.15	22.125	21.875	21.375
Com. Bronze, 90%	52.78	52.72	53.32	55.34	29.250	29.000	28.500
Nickel Silver, 10%	60.20	62.53g	62.53	....	27.625	27.375	13.813
Phos. Bronze, A, 5%	73.03	73.53	73.53	74.71	32.250	32.000	31.000
Silicon Bronze	58.82	58.01	58.86	60.80e	31.125	30.875	30.125
Manganese Bronze	53.73	47.83	58.24	....	22.125	21.875	21.375
Muntz Metal	48.14	43.95	....	....	22.375	22.125	21.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: No. 1 heavy copper and wire, 35.00-35.50; No. 2 heavy copper and wire, 34.00-34.50; light copper, 32.00-32.50; No. 1 composition red brass, 28.00-28.50; No. 1 composition turnings, 26.50-27.50; yellow brass turnings, 17.50-18.00; new brass clippings, 22.00-23.00; light brass, 17.50-18.00; heavy yellow brass, 20.50-21.00; new brass rod ends, 20.50-21.00; auto radiators, unsweated, 22.00-22.50; cocks and faucets, 22.50-23.00; brass pipe, 23.50-24.00.

Lead: Heavy, 11.50-12.00; battery plates, 6.50-6.75; linotype and stereotype, 14.00-14.25; electrotype, 12.00-12.50; mixed babbitt, 14.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 38.50-42.00; old sheets, 34.00-36.00; turnings, 29.50; rods, 38.50-42.00.

Nickel: Sheets and clips, 80.00-90.00; rolled anodes, 80.00-90.00; turnings, 65.00-75.00; rod ends, 80.00-90.00.

Zinc: Old zinc, 5.00-5.50; new die-cast scrap, 5.00-5.50; old die-cast scrap, 3.50-3.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 22.00; 3003 clippings, 21.00-21.75; 6151 clippings, 20.50-21.50; 5052 clippings, 20.50-21.50; 2014 clippings, 20.00-21.00; 2017 clippings, 20.00-21.00; 2024 clippings, 20.00-21.00; mixed clippings, 20.00-21.50; old sheet, 18.00-19.00; old cast 18.50-19.00; clean old cable (free of steel), 21.50-22.00; borings and turnings, 18.50-19.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 48.00; light scrap, 43.00.

Copper and Brass: No. 1 copper, 38.00; No. 2 copper, 36.50; light copper, 34.50-34.75; refinery brass (60% copper) per dry copper content, 33.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 copper, 39.50; No. 2 copper, 38.00; light copper, 36.00; No. 1 composition borings, 30.50-31.00; No. 1 composition solids, 31.00-31.50; heavy yellow brass solids, 22.00-23.50; yellow brass turnings, 21.50-22.00; radiators, 24.50-25.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 51.42, oval, 50.92, 5000-10,000 lb; electrodeposited, 45.78, 2000-5000 lb lots; cast, 52.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.155 200-499 lb, $1.14, 500-999 lb, $1.135; 1000 lb or more,$1.13.

Zinc: Bar, 21.00; bar or flat top, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 76.80; 200 lb, 76.05; 300 lb, 75.80; 400-900 lb, 75.05; 1000 lb and over, 73.05; effective Mar. 24, 1955.

Copper Sulphate: Crystal, 100 lb, 21.50; 200 lb, 18.50; 300 lb, 17.50; 400 lb, 17.00; 500-1900 lb, 15.50; 2000-10,000 lb, 15.25; 10,000 lb and up, 15.15. Powder, add 0.5 to above prices. Effective Mar. 29, 1955.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 83.125; 16-oz bottle, 81.875; 80-oz bottle, 79.375; 100-oz bottle, 79.375; f.o.b. St. Louis, New York and Los Angeles. Effective Apr. 6, 1953.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 73.00; 100-600 lb, 58.6; 700-1900 lb, 56.1; 2000-9900 lb, 54.4; 10,000 lb or more, 53.2.

Stannous Chloride (Anhydrous): Less than 50 lb, $1.594 50 lb, $1.254; 100-300 lb, $1.104; 400-900 lb, $1.08; 1000-1900 lb, $1.055; 2000-4900 lb, $1.019; 5000-19,900 lb, 95.8; 20,000 lb or more, 89.7.

Stannous Sulphate: Less than 50 lb, $1.293; 50 lb, 99.30; 100-1900 lb, 97.30; 2000 lb or more, 95.3.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb 50 lb, 98.70; 100-1900 lb, 96.70; 2000 lb or and over, 52.30.

There's *this* about "Fischer Turned" BRASS AND ALUMINUM NUTS

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COUNTERSUNK BOTH SIDES

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C-271-FS

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to page 193. Key to footnotes, page 195.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ....$65.50

INGOTS, Alloy (NT)

Detroit R7 ....$69.00
Houston S5 ....74.00
Midland,Pa. C18 ....69.00
Munhall,Pa. U5 ....69.00

BILLETS, BLOOMS & SLABS Carbon, rerolling (NT)

Aliquippa,Pa. J5 ....$68.50
Bessemer,Pa. U5 ....68.50
Bridgeport,Conn. N19 ..77.50
Buffalo R2 ....68.50
Clairton,Pa. U5 ....68.50
Ensley,Ala. T2 ....68.50
Fairfield,Ala. T2 ....68.50
Fontana,Calif. K1 ....76.00
Gary,Ind. U5 ....68.50
Johnstown,Pa. B2 ....68.50
Lackawanna,N.Y. B2 ..68.50
LoneStar,Tex. L6 ....70.00
Munhall,Pa. U5 ....68.50
Pittsburgh J5 ....68.50
So.Chicago,Ill. R2, U5..68.50
So.Duquesne,Pa. U5 ..68.50
Youngstown R2 ....68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$84.50
Bessemer,Pa. U5 ....84.50
Bridgeport,Conn. N19 ..89.50
Buffalo R2 ....84.50
Canton,O. R2 ....86.50
Clairton,Pa. U5 ....84.50
Conshohocken,Pa. A3 ..89.50
Ensley,Ala. T2 ....84.50
Fairfield,Ala. T2 ....84.50
Fontana,Calif. K1 ....92.00
Gary,Ind. U5 ....84.50
Geneva,Utah C11 ....84.50
Houston S5 ....89.50
Johnstown,Pa. B2 ....84.50
Lackawanna,N.Y. B2 ..84.50
LosAngeles B3 ....94.00
Midland,Pa. C18 ....84.50
Munhall,Pa. U5 ....84.50
Pittsburgh J5 ....84.50
Seattle B3 ....98.00
S.Chicago R2,U5,W14..84.50
S.Duquesne,Pa. U5 ....84.50
S.SanFrancisco B3 ....94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ....$96.00
Buffalo R2 ....96.00
Canton,O. R2, T7 ....96.00
Conshohocken,Pa. A3..103.00
Detroit R7 ....96.00
Fontana,Calif. K1 ....115.00
Gary,Ind. U5 ....96.00
Houston S5 ....101.00
Ind.Harbor,Ind. Y1 ...96.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 ....116.00
Massillon,O. R2 ....96.00
Midland,Pa. C18 ....96.00
Munhall,Pa. U5 ....96.00
S.Chicago R2,U5,W14..96.00
S.Duquesne,Pa. U5 ....96.00
Struthers,O. Y1 ....96.00
Warren,O. C17 ....96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ....$103.50
Canton,O. R2 ....103.50
Cleveland R2 ....103.50
Gary,Ind. U5 ....103.50
S.Chicago R2, W14 ..103.50
S.Duquesne,Pa. U5 ..103.50

SKELP

Aliquippa,Pa. J5 ....4.325
LoneStar,Tex. L6 ....4.30
Munhall,Pa. U5 ....4.225
SparrowsPoint,Md. B2..4.225
Warren,O. R2 ....4.225
Youngstown R2, U5 ...4.225

WIRE RODS

AlabamaCity,Ala. R2 ..5.025
Aliquippa,Pa. J5 ....5.025
Alton,Ill. L1 ....5.20
Buffalo B11, W12 ....5.025
Cleveland A7 ....5.025
Donora,Pa. A7 ....5.025
Fairfield,Ala. T2 ....5.025
Houston S5 ....5.275
IndianaHarbor,Ind. Y1 .5.025
Johnstown,Pa. B2 ....5.025
Joliet,Ill. A7 ....5.025
KansasCity,Mo. S5 ....5.275
Kokomo,Ind. C16 ....5.125
LosAngeles B3 ....5.825
Minnequa,Colo. C10....5.275
Monessen,Pa. P7 ....5.025
N.Tonawanda,N.Y. B11 5.025
Pittsburg,Calif. C11 ...5.675
Portsmouth P12 ....5.025
Roebling,N.J. R5 ....5.125
S.Chicago,Ill. R2 ....5.025
SparrowsPoint,Md. B2..5.125
Sterling,Ill.(1) N15 ....5.025
Sterling,Ill. N15 ....5.125
Struthers,O. Y1 ....5.025
Worcester,Mass. A7 ...5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ....4.60
Aliquippa,Pa. J5 ....4.60
Bessemer,Ala. T2 ....4.60
Bethlehem,Pa. B2 ....4.65
Birmingham C15 ....4.60
Clairton,Pa. U5 ....4.60
Fairfield,Ala. T2 ....4.60
Fontana,Calif. K1 ....5.25
Gary,Ind. U5 ....4.60
Geneva,Utah C11 ....4.60
Houston S5 ....4.70
Ind.Harbor,Ind. I-2 ....4.60
Johnstown,Pa. B2 ....4.65
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ...4.65
LosAngeles B3 ....5.30
Minnequa,Colo. C10 ....4.90
Munhall,Pa. U5 ....4.60
Niles,Calif. P1 ....4.90
Portland,Oreg. O4 ....5.35
Phoenixville,Pa. P4 ....5.15
Seattle B3 ....5.35
S.Chicago U5, W14 ....4.60
S.SanFrancisco B3 ....5.25
Torrance,Calif. C11 ....5.30
Weirton,W.Va. W6 ....4.60

Wide Flange

Bethlehem,Pa. B2 ....4.65
Clairton,Pa. U5 ....4.60
Fontana,Calif. K1 ....5.40
Lackawanna,N.Y. B2 ...4.65
Munhall,Pa. U5 ....4.60
Phoenixville,Pa. P4 ....5.15
S.Chicago,Ill. U5 ....4.60

Alloy Std. Shapes

Clairton,Pa. U5 ....5.65
Fontana,Calif. K1 ....7.30
Gary,Ind. U5 ....5.65
Houston S5 ....5.75
Munhall,Pa. U5 ....5.65
S.Chicago,Ill. U5 ....5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ....6.75
Bessemer,Ala., T2 ....6.75
Bethlehem,Pa. B2 ....6.80
Clairton,Pa. U5 ....6.75
Fairfield,Ala. T2 ....6.75
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 ....6.75
Geneva,Utah C11 ....6.75
Houston S5 ....6.85
Ind.Harbor,Ind. I-2, Y1..6.75
Johnstown,Pa. B2 ....6.80
KansasCity,Mo. S5 ....6.85
Lackawanna,N.Y. B2 ...6.80
LosAngeles B3 ....7.45
Munhall,Pa. U5 ....6.75
Seattle B3 ....7.50
S.Chicago,Ill. U5, W14..6.75
S.SanFrancisco B3 ....7.40
Struthers,O. Y1 ....6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ....6.80
Lackawanna,N.Y. B2 ...6.80
Munhall,Pa. U5 ....6.75
S.Chicago,Ill. U5 ....6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ....4.65
Lackawanna,N.Y. B2 ..4.65
Munhall,Pa. U5 ....4.60
S.Chicago,Ill. U5 ....4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....5.45
Lackawanna,N.Y. B2 ...5.45
Munhall,Pa. U5 ....5.45
S.Chicago,Ill. U5 ....5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ....4.50
Aliquippa,Pa. J5 ....4.50
Ashland,Ky.(15) A10 ...4.50
Bessemer,Ala. T2 ....4.50
Bridgeport,Conn. N19 ...4.75
Buffalo R2 ....4.50
Clairton,Pa. U5 ....4.50
Claymont,Del. C22 ....4.50
Cleveland J5, R2 ....4.60
Coatesville,Pa. L7 ....4.50
Conshohocken,Pa. A3 ...4.50
Detroit M1 ....4.60
Ecorse,Mich. G6 ....4.60
Fairfield,Ala. T2 ....4.50
Fontana,Calif.(30) K1 ..5.15
Gary,Ind. U5 ....4.50
Geneva,Utah C11 ....4.50
GraniteCity,Ill. G4 ....4.70
Harrisburg,Pa. C5 ....5.10
Houston S5 ....4.60
Ind.Harbor,Ind. I-2, Y1 .4.50
Johnstown,Pa. B2 ....4.50
Lackawanna,N.Y. B2 ...4.50
LoneStar,Tex. L6 ....4.55
Mansfield,O. E6 ....4.50
Minnequa,Colo. C10 ....5.35
Munhall,Pa. U5 ....4.50
Newport,Ky. N9 ....4.50
Pittsburgh J5 ....4.50
Riverdale,Ill. A1 ....4.50
Seattle B3 ....5.40
Sharon,Pa. S3 ....4.50
S.Chicago R2, U5, W14..4.50
SparrowsPoint,Md. B2 ..4.50
Steubenville,O. W10 ....4.50
Warren,O. R2 ....4.50
Weirton,W.Va. W6 ....4.50
Youngstown R2, U5, Y1.4.50

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ....6.30
Geneva,Utah C11 ....5.65
Johnstown,Pa. B2 ....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 ....10.40

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 ....6.725
Bessemer,Ala. T2 ....6.725
Clairton,Pa. U5 ....6.725
Cleveland J5, R2 ....6.725
Coatesville,Pa. L7 ....6.725
Conshohocken,Pa. A3 ..6.725
Ecorse,Mich. G5 ....6.825
Fairfield,Ala. T2 ....6.725
Fontana,Calif.(30) K1..7.375
Gary,Ind. U5 ....6.725
Geneva,Utah C11 ....6.725
Houston S5 ....6.825
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 ....6.725
LosAngeles B3 ....7.625
Munhall,Pa. U5 ....6.725
Pittsburgh J5 ....6.725
Seattle B3 ....7.625
Sharon,Pa. S3 ....6.725
S.Chicago,Ill. U5, W14..6.725
SparrowsPoint,Md. B2..6.725
Youngstown U5, Y1 ...6.725

PLATES, Alloy

Bridgeport,Conn. N19 ...6.55
Claymont,Del. C22 ....6.30
Coatesville,Pa. L7 ....6.30
Fontana,Calif. K1 ....6.95
Gary,Ind. U5 ....6.30
Houston S5 ....6.40
Ind.Harbor,Ind. Y1 ....6.30
Johnstown,Pa. B2 ....6.30
Munhall,Pa. U5 ....6.30
Newport,Ky. N9 ....6.30
Seattle B3 ....7.20
Sharon,Pa. S3 ....6.30
S.Chicago,Ill. U5, W14..6.30
SparrowsPoint,Md. B2 ..6.30
Youngstown Y1 ....6.30

FLOOR PLATES

Cleveland J5 ....5.575
Conshohocken,Pa. A3 ..5.575
Harrisburg,Pa. C5 ....5.575
Ind.Harbor,Ind. I-2 ....5.575
Munhall,Pa. U5 ....5.575
S.Chicago,Ill. U5 ....5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10...4.75
Ashland l.c.l. (15) A10..5.25
Cleveland c.l. R2 ....5.10
Warren,O. c.l. R2 ....5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 ....4.65
Aliquippa,Pa. J5 ....4.65
Alton,Ill. L1 ....4.85
Atlanta A11 ....4.85
Bessemer,Ala. T2 ....4.65
Birmingham C15 ....4.65
Bridgeport,Conn. N19 ...4.80
Buffalo R2 ....4.65
Canton,O. R2 ....4.75
Clairton,Pa. U5 ....4.65
Cleveland R2 ....4.65
Ecorse,Mich. G5 ....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 ....4.65
FairlessHills,Pa. U5 ....4.80
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 ....4.65
Houston S5 ....4.90
Ind.Harbor,Ind. I-2, Y1.4.65
Johnstown,Pa. B2 ....4.65
Joliet,Ill. P22 ....4.65
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ...4.65
LosAngeles B3 ....5.35
Massillon,O. R2 ....4.75
Midland,Pa. C18 ....4.65
Milton,Pa. M18 ....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 ....5.00
N.Tonawanda,N.Y. B11 ..4.65
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 ....4.65
Portland,Oreg. O4 ....5.40
Seattle B3, N14 ....5.40
S.Chicago R2, U5, W14..4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFran.,Calif. B3 ..5.40
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 ....4.75
Struthers,O. Y1 ....4.65
Torrance,Calif. C11 ....5.35
Warren,O. R2 ....4.65
Weirton,W.Va. W6 ....4.65
Youngstown R2, U5 ....4.65

BARS, H.R. Leaded

Warren,O. C17 ....6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.575
Bridgeport,Conn. N19 ..5.725
Buffalo R2 ....5.575
Canton,O. R2, T7 ....5.575
Clairton,Pa. U5 ....5.575
Detroit R7 ....5.575
Ecorse,Mich. G5 ....5.675
Fontana,Calif. K1 ....6.625
FairlessHills,Pa. U5 ..5.725
Gary,Ind. U5 ....5.575
Houston S5 ....5.825
Ind.Harbor,Ind. I-2, Y1.5.575
Johnstown,Pa. B2 ....5.575
KansasCity,Mo. S5 ....5.825
Lackawanna,N.Y. B2 ...5.575
LosAngeles B3 ....6.625
Massillon,O. R2 ....5.575
Midland,Pa. C18 ....5.575
S.Chicago R2, U5, W14.5.575
S.Duquesne,Pa. U5 ..5.575
Struthers,O. Y1 ....5.575
Warren,O. C17 ....5.575
Youngstown U5 ....5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ....6.80
Bessemer,Ala. T2 ....6.80
Bethlehem,Pa. B2 ....6.80
Clairton,Pa. U5 ....6.80
Cleveland R2 ....6.80
Ecorse,Mich. G5 ....6.90
Fairfield,Ala. T2 ....6.80
Fontana,Calif. K1 ....7.50
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
Ind.Harb.,Ind. I-2, Y1...6.80
Johnstown,Pa. B2 ....6.80
KansasCity,Mo. S5 ....7.05
Lackawanna,N.Y. B2 ...6.80
LosAngeles B3 ....7.50
Pittsburgh J5 ....6.80
Seattle B3 ....7.55
S.Chicago W14 ....6.80
S.Duquesne,Pa. U5 ....6.80
S.SanFrancisco B3 ....7.55
Struthers,O. Y1 ....6.80
Warren,O. R2 ....6.80
Youngstown U5 ....6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 ....4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ....4.65
Atlanta A11 ....4.85
Fontana,Calif. K1 ....5.35
Niles,Calif. P1 ....5.00
Pittsburgh J5 ....4.30
Portland,Oreg. O4 ....5.05
SanFrancisco S7 ....5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ....5.65
Gary,Ind. U5 ....5.65
Houston S5 ....5.90
KansasCity,Mo. S5 ....5.90
Youngstown U5 ....5.65

BARS, C.F. Leaded

Ambridge,Pa. W18 ....7.525
Camden,N.J. P13 ....8.50
Chicago W18 ....7.525
Cleveland C20 ....7.65
Monaca,Pa. S17 ....8.325
Newark,N.J. W18 ....7.70
SpringCity,Pa. K3 ....8.50
Warren,O. C17 ....8.325

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....5.90
BeaverFalls,Pa. M12, R2..5.90
Buffalo B5 ....5.95
Camden,N.J. P13 ....6.35
Carnegie,Pa. C12 ....5.90
Chicago W18 ....5.90
Cleveland A7, C20 ....5.90
Detroit R7 ....5.90
Detroit B5, P17 ....6.10
Donora,Pa. A7 ....5.90
Elyria,O. W8 ....5.90
FranklinPark,Ill. N5 ....5.90
Gary,Ind. R2 ....5.90
GreenBay,Wis. F7 ....5.90
Hammond,Ind. L2, M13..5.90
Hartford,Conn. R2 ....6.40
Harvey,Ill. B5 ....5.90
LosAngeles R2, S30 ....7.35
Mansfield,Mass. B5 ....6.45
Massillon,O. R2, R8 ....5.90
Midland,Pa. C18 ....5.90
Monaca,Pa. S17 ....5.90
Newark,N.J. W18 ....6.35
NewCastle,Pa.(17) B4 ..5.90
Pittsburgh J5 ....5.90
Plymouth,Mich. P5 ....6.15
Putnam,Conn. W18 ....6.45
Readville,Mass. C14 ....6.45
S.Chicago,Ill. W14 ....5.90
SpringCity,Pa. K3 ....6.35
Struthers,O. Y1 ....5.90
Waukegan,Ill. A7 ....5.90
Worcester,Mass. W19 ...6.35
Youngstown F3, Y1 ....5.90

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md. C19 ...5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....7.425
BeaverFalls,Pa. M12,R2 7.425
Bethlehem,Pa. B2 ....7.425
Buffalo B5 ....7.425
Camden,N.J. P13 ....7.60
Canton,O. T7 ....7.425
Carnegie,Pa. C12 ....7.425
Chicago W18 ....7.425
Cleveland A7, C20 ....7.425
Detroit R7 ....7.425
Detroit B5, P17 ....7.625
Donora,Pa. A7 ....7.425
Elyria,O. W8 ....7.425
Gary,Ind. R2 ....7.425
GreenBay,Wis. F7 ....7.425
Hammond,Ind. L2, M13.7.425
Hartford,Conn. R2 ....7.725
Harvey,Ill. B5 ....7.425
Lackawanna,N.Y. B2 ..7.425
LosAngeles S30 ....9.10
Mansfield,Mass. B5 ..7.725
Massillon,O. R2, R8 ..7.425
Midland,Pa. C18 ....7.425
Monaca,Pa. S17 ....7.425
Newark,N.J. W18 ....7.60
Plymouth,Mich. P5 ....7.625
S.Chicago W14 ....7.425
SpringCity,Pa. K3 ....7.60
Struthers,O. Y1 ....7.425
Warren,O. C17 ....7.425
Waukegan,Ill. A7 ....7.425
Worcester,Mass. A7 ...7.725
Youngstown F3, Y1 ....7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ....4.65
Atlanta A11 ....4.85
Birmingham C15 ....4.65
Buffalo R2 ....4.65
Cleveland R2 ....4.65
Ecorse,Mich. G5 ....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 ....4.65
FairlessHills,Pa. U5 ....4.80
Fontana,Calif. K1 ....5.35
Ft. Worth,Tex.(42) T4 ..5.10
Gary,Ind. U5 ....4.65
Houston S5 ....4.90

Ind.Harbor,Ind. I-2, Y1 4.65
Johnstown,Pa. B2 4.65
Joliet,Ill. P22 4.65
KansasCity,Mo. S5 4.90
Lackawanna,N.Y. B2 4.65
LosAngeles B3 5.35
Milton,Pa. M18 4.65
Minnequa,Colo. C10 5.10
Niles,Calif. P1 5.00
Pittsburg,Calif. C11 5.35
Pittsburgh J5 4.65
Portland,Oreg. O4 5.40
SandSprings,Okla. S5 5.15
Seattle B3, N14 5.40
S.Chicago R2 4.65
S.Duquesne,Pa. U5 4.65
S.SanFrancisco B3 5.40
SparrowsPoint,Md. B2 4.65
Sterling,Ill.(1) N15 4.65
Sterling,Ill. N15 4.75
Struthers,O. Y1 4.65
Torrance,Calif. C11 5.35
Youngstown R2, U5, Y1 4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2 6.15
KansasCity,Kans. S5 6.45
Lackawanna,N.Y. B2 6.17
Marion,O. P11 5.90
Pittsburgh U8 6.17
Seattle B3, N14 6.60
SparrowsPt. ¼-1" B2 6.15
Williamsport,Pa. S19 6.00

RAIL STEEL BARS

Avis,Pa.(3) J8 4.25
ChicagoHts.(3) C2, I-2 4.55
ChicagoHts.(4) C2, I-2 4.65
Ft.Worth,Tex.(26) T4 4.95
Franklin,Pa.(3) F5 4.55
Franklin,Pa.(4) F5 4.65
Marion,O.(3) P11 4.50
Moline,Ill.(3) R2 4.65
Tonawanda(3) B12 4.50
Tonawanda(4) B12 4.65
Williamsport,Pa.(3) S19 4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt) B14 14.65
McK.Rks.(S.R.) L5 11.50
McK.Rks.(D.R.) L5 16.00
McK.Rks.(Staybolt) L5 17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 4.325
Allenport,Pa. P7 4.325
Ashland,Ky.(8) A10 4.325
Cleveland J5, R2 4.325
Conshohocken,Pa. A3 4.375
Detroit(8) M1 4.425
Dravosburg,Pa. U5 4.325
Ecorse,Mich. G5 4.425
Fairfield,Ala. T2 4.325
FairlessHills,Pa. U5 4.375
Fontana,Calif. K1 5.075
Gary,Ind. U5 4.325
Geneva,Utah C11 4.425
GraniteCity,Ill. G4 4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Kokomo,Ind. C16 4.425
Lackawanna,N.Y. B2 4.325
Mansfield,O. E6 (37) 4.325
Munhall,Pa. U5 4.325
Newport,Ky.(8) N9 4.325
Niles,O. N12 4.325
Pittsburg,Calif. C11 5.025
Pittsburgh J5 4.325
Portsmouth,O. P12 4.325
Riverdale,Ill. A1 4.326
Sharon,Pa. S3 4.325
S.Chicago,Ill. W14 4.325
SparrowsPoint,Md. B2 4.325
Steubenville,O. W10 4.325
Warren,O. R2 4.325
Weirton,W.Va. W6 4.325
Youngstown U5, Y1 4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 5.625
Kokomo,Ind. C16 5.475
Niles,O. N12 5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 7.20
Youngstown Y1 7.20

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 6.375
Conshohocken,Pa. A3 6.425
Dravosburg,Pa. U5 6.375
Ecorse,Mich. G5 6.475
Fairfield,Ala. T2 6.375
FairlessHills,Pa. U5 6.425
Fontana,Calif. K1 7.125
Gary,Ind. U5 6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 6.375
Munhall,Pa. U5 6.375
Pittsburgh J5 6.375
Sharon,Pa. S3 6.375
S.Chicago,Ill. U5 6.375
SparrowsPoint(36) B2 6.375
Warren,O. R2 6.375
Weirton,W.Va. W6 6.375
Youngstown U5, Y1 6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 4.575
Cleveland R2 4.925
Ind.Harbor,Ind. I-2 4.575
Warren,O. R2 4.925

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 5.325
Cleveland J5, R2 5.325
Conshohocken,Pa. A3 5.375
Dravosburg,Pa. U5 5.325
Detroit M1 5.325
Ecorse,Mich. G5 5.425
Fairfield,Ala. T2 5.325
FairlessHills,Pa. U5 5.375
Follansbee,W.Va. B20 5.325
Fontana,Calif. K1 6.425
Gary,Ind. U5 5.325
GraniteCity,Ill. G4 5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 5.325
Mansfield,O. E6 5.325
Middletown,O. A10 5.325
Newport,Ky. N9 5.325
Pittsburg,Calif. C11 6.275
Pittsburgh J5 5.325
Portsmouth,O. P12 5.325
SparrowsPoint,Md. B2 5.325
Steubenville,O. W10 5.325
Warren,O. R2 5.325
Weirton,W.Va. W6 5.325
Youngstown Y1 5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 7.875
Dravosburg,Pa. U5 7.875
Ecorse,Mich. G5 7.975
FairlessHills,Pa. U5 7.925
Fontana,Calif. K1 8.975
Gary,Ind. U5 7.875
IndianaHarbor,Ind. Y1 7.875
Lackawanna(37) B2 7.875
Pittsburgh J5 7.875
SparrowsPoint(38) B2 7.875
Warren,O. R2 7.875
Weirton,W.Va. W6 7.875
Youngstown Y1 7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.90	...
Canton,O. R2	6.50	7.10
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 7.15
Gary, Ind. U5 5.95
MartinsFry,O. W10 6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 5.85‡
Ashland,Ky. A10 5.85†
Canton,O. R2 5.85‡
Delphos,O. N16 6.60‡
Dover,O. R1 5.85‡
Dravosburg,Pa. U5 5.85†
Fairfield,Ala. T2 5.85‡
Gary,Ind. U5 5.85*
GraniteCity,Ill. G4 6.05
Ind.Harbor,Ind. I-2 5.85†
Kokomo,Ind. C16 5.95‡
MartinsFerry,O. W10 5.85*
Middletown,O. A10 5.85‡
Newport, Ky. N9 5.85‡
Niles,O. N12 6.85‡
Pittsburg,Calif. C11 6.60*
SparrowsPt.,Md. B2 5.85‡
Steubenville,O. W10 5.85‡
Warren,O. R2 5.85†
Weirton,W.Va. W6 5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 6.575

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 8.60
SparrowsPoint(39) B2 8.60

SHEETS, Galvannealed Steel

Canton,O. R2 6.25
Dravosburg,Pa. U5 6.25
Kokomo,Ind. C16 6.60
Newport,Ky. N9 6.25
Niles,O. N12 7.25

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 6.10
Middletown,O. A10 6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 6.30
Niles,O.(28) R2 6.30
Weirton,W.Va. W6 6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.50
Butler,Pa. A10 (type 2) 8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 5.90
Cleveland R2 5.90
Dravosburg,Pa. U5 5.90
Gary,Ind. U5 5.90
GraniteCity,Ill. G4 6.10
Ind.Harbor,Ind. I-2 5.90
Middletown,O. A10 5.90
Niles,O. N12 5.90
Youngstown Y1 5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. B20 7.75
Yorkville,O. W10 7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 6.25
Mansfield,O. E6 6.25
Middletown,O. A10 6.25
Niles,O. N12 6.25
Weirton,W.Va. W6 6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 6.65

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.
B20 Berkman Co., Louis

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RellianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.325
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.075
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2, Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackawanna,N.Y.(25) B2	4.325
LosAngeles(25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
NewBritain(10) S15	4.325
N.Tonawanda,N.Y. B11	*4.325*
Pittsburg,Calif. C11	5.075
Portsmouth,O. P12	4.325
Riverdale,Ill. A1	4.325
SanFrancisco S7	5.05
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago,Ill. W14	4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
S.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.425
Ecorse,Mich. G5	6.525
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.525
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2, Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575
Warren,O. R2	4.925

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	*6.25*
Cleveland J5	6.45
Cleveland A7	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1, P20	6.35
Dover,O. G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. B20	6.25
Fontana,Calif. K1	8.00
FranklinPark,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y1	6.45
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.50
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7	7.00
NewHaven,Conn. D2	6.70
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.45
Portsmouth,O P12	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y.(32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2, T5	6.25
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	7.10
Youngstown Y1	6.45
Youngstown C8	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7	9.30
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	...
Carnegie,Pa. S18	...	8.95	10.50	12.65	...
Cleveland A7	7.00	8.95	10.50	12.65	15.35
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	7.10	9.05	10.60	...	...
Detroit D2	7.10	9.05	10.60	12.75	...
Dover,O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee,W.Va. B20	7.40	8.95	10.50**	...	...
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
NewBritain,Conn.(10) S15	7.00	8.95	10.50	12.65	15.35
NewCastle,Pa. B4, E5	7.00	8.95	10.50	12.65	...
NewHaven,Conn. D2	7.45	9.25	10.80	12.95	...
NewKensington,Pa. A6	7.00	8.95	10.50	...	...
NewYork W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale,Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton,N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	7.00	8.95	10.50	12.65	15.35
Weirton,W.Va. W6	7.00	8.95	10.50	12.65	15.35
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester Mass. A7	7.85	9.25	10.80	12.95	15.65
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.065 C. max.

Spring Steel (Tempered)

Bristol,Conn. W1	...	...	14.40	17.60	...
Buffalo W12	...	...	14.40	...	...
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. A7, T6	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	...	...
Youngstown C8	...	...	14.75	17.95	21.35

Ind.Harbor,Ind. Y1 ... 9.30
Lackawanna,N.Y. B2 .. 9.125
Sharon,Pa. S3 ... 9.10
SparrowsPoint,Md. B2 .. 9.125
Warren,O. R2 ... 9.10
Weirton,W.Va. W6 ... 9.10
Youngstown Y1 ... 9.30

STRIP, Electrogalvanized

Cleveland A7	6.40*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.55*
Youngstown C8	6.25*
Warren,O. T5	6.25*
Warren,O. B9	6.45*
Weirton,W.Va. W6	5.75*
Worcester,Mass. A7	7.30*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	...
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	...
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	...
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville,O. A10	...	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	...	...	...
Newport,Ky. N9	12.80	...	...	...
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	...	15.85	17.45	17.95	13.55‡
Butler,Pa. A10	...	...	17.45	17.95	...
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	...	...	...	...	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils annealed, semiprocessed ½c lower. §Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Dravosburg,Pa. U5	7.50	7.75	8.15
Fairfield,Ala. T2	7.60	7.85	8.25
FairlessHills,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15
ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175		
Niles,O. R2	6.675	6.875	7.075

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Dravosburg,Pa. U5	8.80	9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Pitts.Calif. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.60
Dravosburg,Pa. U5	6.60
Fairfield,Ala. T2	6.70
FairlessHills,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Niles,O. R2	6.60
Pittsburg,Calif. C11	7.35
SparrowsPoint,Md. B2	6.70
Warren,O. R2	6.60
Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$7.85
Gary,Ind. U5	7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.25
Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.425
Atlanta A11	6.45
Bartonville,Ill. K4	6.35
Buffalo W12	6.25
Chicago W13	6.25
Cleveland A7	6.25
Crawfordsville,Ind. M8	6.35
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fairfield,Ala. T2	6.25
Fostoria,O.(24) S1	6.45
Houston S5	6.50
Jacksonville,Fla. M8	6.77
Johnstown,Pa. B2	6.25
Joliet,Ill. A7	6.25
KansasCity,Mo. S5	6.50
Kokomo,Ind. C16	6.35
LosAngeles B3	7.20
Minnequa,Colo. C10	6.50
Monessen,Pa. P7	*6.25*
Newark 6-8 ga. I-1	6.90
N.Tonawanda B11	*6.25*
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Portsmouth,O. P12	6.25
Rankin,Pa. A7	6.25
S.Chicago,Ill. R2	6.25
S.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Sterling,Ill.(1) N15	6.25
Sterling,Ill. N15	6.35
Struthers,O. Y1	6.25
Waukegan,Ill. A7	6.25
Worcester,Mass. A7	6.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.90
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt.,Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
WorcesterA7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.50
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P16	7.60
NewHaven,Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	7.60
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	13.08
Johnstown,Pa. B2	12.55
Minnequa,Colo. C10	12.30
Monessen,Pa. P16	12.55
Muncie,Ind I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. T6	12.85
Worcester,Mass. A7	12.80

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Portsmouth,O. P12	10.70
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	10.80

ROPE WIRE (A)

Bartonville,Ill. K4	10.55
Buffalo W12	9.75
Fostoria,O.(23) S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.05
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.85
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Alton,Ill. L1	14.225
Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.00
Baltimore T6	9.30
Buffalo W12	9.00
Cleveland A7	9.00
Crawfordsville,Ind. MS	9.00
Dover,O. G6	9.00
Fostoria,O. S1	9.00
FranklinPark,Ill. T6	9.10
Kokomo,Ind. C16	9.00
Massillon,O. R8	9.00
Milwaukee C23	9.20
Monessen,Pa. P16	9.00
Pawtucket,R.I. N8	9.30
Riverdale,Ill A1	9.10
Rome,N.Y. R6	9.00
Trenton,N.J. R5	9.30
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. MS	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	*152*
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester, Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.05
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. MS	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	*152*
Pittsburg,Calif. C11	171
Rankin,Pa. A2	152
SparrowsPt., Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150

AlabamaCity,Ala. R2	$9.35
Bartonville,Ill. K4	9.45
Buffalo W12	9.36
Crawfordsville,Ind. MS	9.46
Donora,Pa. A7	9.35
Duluth,Minn. A7	9.35
Johnstown,Pa. B2	9.35
Joliet,Ill. A7	9.35
Kokomo,Ind. C16	9.45
LosAngeles B3	10.14
Minnequa,Colo. C10	9.60
S.Chicago,Ill. R2	9.35
SparrowsPt.,Md. B2	9.45
Sterling, Ill. N15	9.35

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.65
Bartonville,Ill. K4	9.75
Buffalo W12	9.60
Crawfordsville,Ind. MS	9.75
Donora,Pa. A7	9.65
Duluth,Minn. A7	9.65
Johntown,Pa. B3	9.65
Joliet,Ill. A7	9.65
Kokomo,Ind. C16	9.75
LosAngeles B3	10.45
Minnequa,Colo. C10	9.90
S.Chicago,Ill. R2	9.65
SparrowsPt.,Md. B2	9.75
Sterling,Ill. N15	9.65

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.70
Bartonville,Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville,Ind. MS	9.80
Donora,Pa. A7	9.70
Duluth,Minn. A7	9.70
Johnstown,Pa. B2	9.70
Joliet,Ill. A7	9.70
Kokomo,Ind. C16	9.80
LosAngeles B3	11.05
Minnequa,Colo. C10	9.95
S.Chicago,Ill. R2	9.70
SparrowsPt.,Md. B2	9.80
Sterling,Ill. N15	9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa J5	172‡
Atlanta A11	181
Bartonville,Ill K4	181
Crawfordsville,Ind. MS	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180†
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180†
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	*179**
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
S.Chicago,Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179*

WOVEN Fence, 9-15 Ga.

	Col.
Ala.City,Ala. R2	162**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Aliq'ppa,Pa.9-14½ga. J5	165‡
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. MS	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167†
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity,Mo. S5	167†
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	*166**
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
S.Chicago,Ill. R2	162**
Sterling,Ill.(1) N15	166*

WIRE (16 Gage)	An'ld Stone	Galv. Stone
Ala.City R2	14.50	16.05**
Bartonville K4	14.60	16.50
Buffalo W12	14.50	
Cleveland A7	14.50	
Crawf'dsville MS	14.60	16.50
Fostoria,O. S1	14.60	16.15†
Johnstown B2	14.15	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer,MassW12	14.50	16.05*
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.40
Waukegan A7	14.50	16.05†
Worcester A7	14.80	

WIRE, Merchant Quality (6 to 8 gage)

	An'ld Galv.
Ala.City,Ala. R2	7.40 7.80**
Aliquippa J5	7.40 7.925‡
Atlanta A11	7.50 8.075
Bartonville(48) K4	7.50 8.075
Buffalo W12	7.40 8.80†
Cleveland A7	7.40
Crawfordsville MS	7.50 8.075
Donora,Pa. A7	7.40 7.80†
Duluth,Minn. A7	7.40 7.80†
Fairfield T2	7.40 7.80†
Houston,Tex. S5	7.65 8.05†
Jacks'ville,Fla.M8	7.90 8.475
Johnstown B2(48)	7.40 7.975*
Joliet,Ill. A7	7.40 7.80†
KansasCity,Mo. S5	7.65 8.05†
Kokomo C16	7.50 7.90†
LosAngeles B3	8.35 8.925*
Minnequa C10	7.65 8.05**
Monessen P7 (48)	*7.40 7.975**
Palmer,Mass. W12	7.70 8.10†
Pitts.,Calif C11	8.35 8.75†
Portsmouth,O. P12	7.40
Rankin A7	7.40 7.80†
S.Chicago R2	7.40 7.80**
S.SanFran. C10	8.35 8.75**
Spar'wsPt.B2(48)	7.50 8.075*
Str'ling(1)(48)	N15 7.40 7.975*
Struthers,O.(48)	Y1 7.40 7.90‡
Worcester,Mass.	A7 7.70

*Based on 12.50c zinc; †5c zinc; ‡10c zinc; §Less than 10c zinc; **Subject to zinc equalization extras.

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	*157*
Duluth,Minn. A7	*157*
Franklin,Pa. F5	*157*
Huntington,W.Va. W7	*157*
Johnstown,Pa. B2	*160*
Marion,O. P11	*157*
Minnequa,Colo. C10	*162*
Moline,Ill. R2	*162*
So.Chicago,Ill. R2	*157*
Tonawanda,N.Y. B12	150
Williamsport,Pa. S10	*160*

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants)

4" and shorter:	
½" & smaller diam.	+5
Over 4" through 6":	
½" and smaller diam	+12
6" and shorter:	
⅝" and ⅝"	+13
¾" and larger	+16
Longer than 6":	
All diameters	+25
Lag bolts, all diams:	
6" and shorter	+2
Over 6" long	+11
Ribbed Necked Carriage	+13
Blank	2
Plow	18
Step, Elevator, Tap and Sleigh Shoe	2
Tire Bolts	12
Boiler & Fitting-Up Bolts	14

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	51
H.P., Hex, regular & heavy	
⅜" and smaller	55
⅝" to 1¼", inclusive	55
1⅜" to 1½", inclusive	57
1⅝" and larger	51
C.P. Hex regular & heavy:	
⅜" and smaller	55
Larger than ⅜"	51
Hot Galv. Nuts (all types):	
¾" or smaller	38
⅞" to 1½", inclusive	36
Finished Hex Nuts:	
¾" and smaller	55
⅞" and larger	51
Semifinished & Slotted Hex:	
Regular and heavy,	
⅜" and smaller	55
⅞" and larger	51

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1" diam x 6" and shorter	19
1" and smaller diam x over 6"	List

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages; plain finish)

3" and shorter:	
1/8" thru ¼" diam, 25,000 to 200,000 pieces	61
Over 200,000 pieces	64
5/16" thru ½" dia:	
15,000 to 100,000 pieces	61
100,000 or more	64
Longer than 3", any diam:	
5000 to 100,000 pieces	61
Over 100,000 pieces	64

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6" or shorter:	
¼" through ½"	34
9/16" & ⅝" & shorter	31
¾", ⅞" through 1 in.	8

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	...	21.06	20.41
1¼	13	...	24.94	20.44
1½	13	23.31	27.57	22.60
1¾	13	27.54	32.57	26.71
2	13	30.87	36.51	29.94
2¼	13	34.77	41.12	33.72
2¼	12	37.73	44.63	36.59
2½	12	41.57	49.16	40.31
2¾	12	45.00	53.22	43.65
3	12	47.99	56.76	46.54

RAILWAY MATERIALS

RAILS	Standard No. 1	Standard No. 2	Tee Rails All	Tee Rails 60 lb Under
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	...	5.65
Fairfield,Ala. T2	...	...	...	5.65
Gary,Ind. U5	4.725	...	...	...
Huntington,W.Va. W7	...	...	...	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	...
Johnstown,Pa. B2	...	...	...	(16)5.65
Lackawanna,N.Y. B2	4.725	4.625	...	5.65
Minnequa,Colo. C10	4.725	4.625	...	5.15
Steelton,Pa. B2	4.725	4.625	...	...
Williamsport,Pa. S19	...	...	...	5.65

TIE PLATES

Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS (20) Treated

Cleveland R2	*12.40*
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	12.40
Minnequa,Colo. C10	12.40
Pittsburgh O3, P14	12.40
Seattle B3	12.90

AXLES

Ind.Harbor,Ind. S13	7.25
Johnstown,Pa. B2	7.25

JOINT BARS

Bessemer,Pa. U5	5.825
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. I-2	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.825

SCREW SPIKES

Cleveland R2	*11.90*
Pittsburgh O3	*11.90*

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.90
Ind.Harbor,Ind. I-2, Y1	7.90
KansasCity,Mo. S5	7.90
Lebanon,Pa. B2	7.90
Minnequa,Colo. C10	7.90
Pittsburgh J5	7.90
Seattle B3	8.40
S.Chicago,Ill. R2	7.90
Struthers,O. Y1	7.90
Youngstown R2	7.90

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed	15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.l.f. N. Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	21.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum: Atomized, 500 lb drums, frght. allowed	
Carlots	32.20
Ton lots	34.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	39.00-49.00†
Bronze, 5000-lb lots	58.00-61.50†
Copper:	
Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	94.00
Nickel-Silver, 5000-lb lots	53.25-60.00†
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	94.00
Stainless Steel, 316	$1.25
Tin	14.50*
Zinc, 5000-lb lots	18.25-32.00‡
Tungsten	Dollars
Melting grade, 99%	
60 to 200 mesh	4.30-4.40
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §79% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.15c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝ in.; 6.90c for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.30c.
(43) 9-14½ Ga.
(48)6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	..	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. F6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	15.5	+1.75	18.5	2.75	21	5.75	23.5	7
Fontana, Calif. K1	...	...	....	....	....	....	*6*	*+11.25*	*9*	*+7.25*	*11.5*	*+3.75*	*14*	*+2.5*
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Lorain, O. N3	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sparrows Pt., Md. B2	23	+ 5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Wheatland, Pa. W9	23	+ 5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	....	....	....
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	....	....	....
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Fontana, Calif. K1	*14.5*	*+1.5*	*15*	*+1*	*16.5*	*+0.75*	*16.5*	*+0.75*	*7*	*+10.75*	*7*	*+10.75*
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Lorain, O. N3	26	10	26.5	10.5	28	10.75	28	10.75	....	....	....	....
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	....	....	....
Sparrows Pt., Md. B2	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (12.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	48.00	48.00
303	....	26.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	39.00	44.25	42.50	45.50	48.25	52.50	52.50
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.50	65.00	63.50	66.00	69.50	73.50	73.50
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	31.00	40.50	48.75	55.25	56.25	57.00	62.00	70.50	70.50
403	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	31.00	....	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	31.50	....	....	....
431	16.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both Sides
Copper*	26.60	33.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5%Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.980

Tool steel producers include; A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Alabama City, Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00†	....
Woodward, Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda, N.Y. W12	58.50	59.00	59.50	60.00
No. Tonawanda, N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester, N.Y. deld.	61.52	62.02	62.52	....
Syracuse, N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Chicago R2	58.50	....	59.00	....
Gary, Ind. U5	58.50	....	59.00	....
So. Chicago, Ill. Y1	58.50	59.00	59.00	59.50
So. Chicago, Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon, Mich., deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron, O., deld.	61.25	61.75	61.75	62.25
Lorain, O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem, Pa. B2	60.50	61.00	61.50	62.00
New York, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro, Pa. B10	60.50	61.00	61.50	62.00
Chester, Pa. C31	54.50	55.00	55.50	....
Philadelphia, deld.	56.16	56.66	57.16	....
Steelton, Pa. B2	60.50	61.00	61.50	62.00
Swedeland, Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy, N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
Neville Island, Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKeesRocks, deld.	....	60.04	60.04	60.54
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
Verona, Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer, Pa. U5	58.50	....	59.00	59.50
Clairton, Rankin, So. Duquesne, Pa. U5	58.50	....	....	....
McKeesport, Pa. N3	58.50	....	....	59.50
Midland, Pa. C18	58.50	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard, O. Y1	....	....	59.00	....
Sharpsville, Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield, O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie, Pa. I-3	58.50	59.00	59.00	59.50
Everett, Mass. E1	60.50	61.00	61.50	....
Fontana, Calif. K1	*64.50*	*65.00*	....	....
Geneva, Utah C11	58.50	59.00	....	....
GraniteCity, Ill. G4	60.40	60.90	61.40	....
Ironton, Utah C11	58.50	59.00	....	....
LoneStar, Texas L6	52.00	52.50*	52.50	....
Minnequa, Colo. C10	60.50	61.00	61.50	....
Rockwood, Tenn. T3	....	55.00‡	59.00	....
Toledo, O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Low phos, southern grade.
†Phos., 0.30 max.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50 Si to 18%; 75 cents for each 0.50% Mn over 1%)

Jackson, O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50 Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls, N.Y. P15	$80.50
Keokuk, Iowa, (Open-hearth & Fdry, freight allowed K2)	87.50
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	90.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035 max.)	$72.50
Steelton, Pa. B2 (Phos. 0.035 max.)	66.50
Philadelphia, deld.	70.05
Troy, N.Y. R2 (Phos. 0.035 max.)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075 max.)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075 max.)	63.50
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075 max.)	63.50

Warehouse Steel Products

Representative prices, cents per pound subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Buffalo, Cleveland, Erie, 30 cents; Chicago, Milwaukee, St. Louis, St. Paul, Detroit, Cincinnati, Pittsburgh, 25 cents; Philadelphia, New York, Baltimore, Boston, San Francisco, Los Angeles, and Portland, Oreg., 10 cents; Atlanta, Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.§	H.R. Alloy 4140††¶		Carbon	Floor
Atlanta	6.79	7.75	8.37	43.43	7.05	...	6.92	8.89	....	7.08	7.09	8.83
Baltimore	7.03	8.32	9.10	....	7.65	...	7.61	8.62[8]	13.44	7.93	7.21	8.87
Birmingham	6.70	7.80	8.85	....	6.95	...	7.00	9.35	....	7.20	7.05	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.80	7.93	8.50	46.55	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	7.92	8.90	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
Cleveland	6.80	7.93	8.85	....	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.12	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
Houston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
Los Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.02	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
Moline, Ill.	7.15	8.28	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
New York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69**
Pittsburgh	6.80	7.93	9.20	48.67	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	11.80	15.00	7.85	7.75	9.60
Richmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.22	9.19	43.89	7.35	...	7.37	8.14	13.14	7.68	7.28	8.75
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25[5]	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00[2]	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
Washington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **⅛-in. and heavier; ††as annealed; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 999 lb and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [2]—500 to 9999 lb; [3]—400 to 999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

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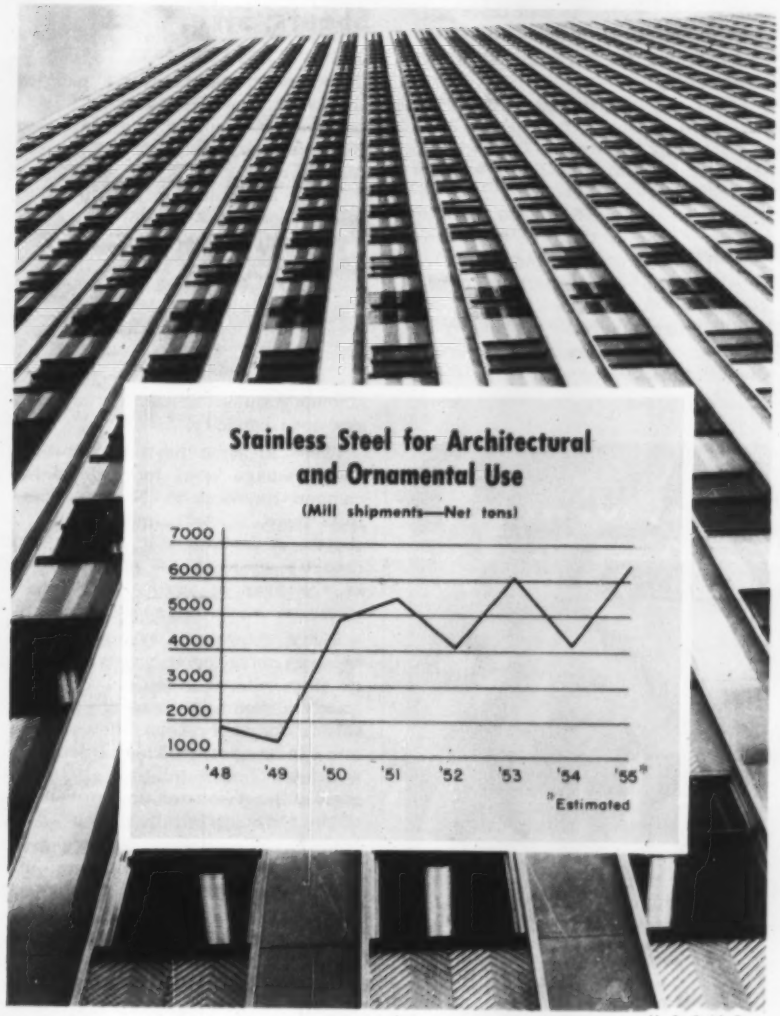

U. S. Steel Corp.

Now that buildings "show their metal" it's a . . .

Bright View for Stainless

ALL THAT GLITTERS is not gold. It might be stainless steel.

Take the use of stainless in architecture. The rise is more than 300 per cent in the last six years. And this market is still in its infancy, says J. G. Terry, development supervisor, Armco Steel Corp., Middletown, O.

Growth Industry — The expected growth in the use of stainless in the next ten years, he predicts, will require architectural metal manufacturers to expand several times their present size to serve the demand for the stainless steel wall alone. As recent as the 1930s, thin metal walls hadn't even come into the dream stage.

While the wall may prove to be the most important item, it won't be the only part of the architectural market. An innovation, such as the metal wall, is like a giant snowball. As it rolls, it increases in momentum and size and picks up other things. The metal skin will take with it the auxiliary items throughout the building like windows, doors, kick plates, parapets, canopies and the thousands of individual metal products that go into a building, Mr. Terry asserts.

Not How Big—Although Mr. Terry thinks the architectural metal manufacturing industry will have to expand, bigness of a member company is not a necessity. Of much more importance to the architect and contractor are versatility, craftsmanship and geographical location.

One way the architectural metal fabricators can cash in on more business is to develop some standard cold-rolled formed sections of stainless. Many fabricators are using extruded architectural sections in other metals. Mr. Terry thinks the fabricators would advance tremendously if they would design about 20 standard sections that the roll forming industry could produce from stainless. "These sections should be complementary, like wood moldings or extruded shapes, so combinations could be made for different effects on the finished installation," Mr. Terry says.

Variety Is The Spice—"Architectural freedom need not be limited by the use of standard sections since many slight variations could be made easily for individual designs," he maintains. "If basic storefront sections were available and a special deep reveal were needed, there is no reason why this one component of the installation could not be brake formed while the rest would be built up from standard sections," Mr. Terry points out.

If standard roll formed sections of stainless were adopted, it could provide a new source of business for warehouses, Mr. Terry suggests. "The steel distributor would be glad to carry these items in his stock if there were a reasonable opportunity of regular turnover. This would eliminate the necessity of large and varied inventories in the shops of architectural metal fabricators, as well as provide quick deliveries of small quantities," he believes.

Easy on the Eyes—So the glitter from the stainless steel buildings won't be objectionable, stainless producers developed a sheet with a soft, uniform sheen and low reflectivity. It's the curtain wall finish. This is being used for the exterior walls of New York's Socony Mobil building, the world's largest metal-clad building. T. S. Fitch, president, Washington Steel Corp., Washington, Pa., believes future sales possibilities of stainless depend not so much on a few monumental buildings like the Socony Mobil as on uses in thousands of small buildings.

Tool Steel . . .

Tool Steel Prices, Page 196

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 11,854 net tons in June, reports the American Iron & Steel Institute. This was an increase over the 11,067 tons moved in May and was up sharply from the 7314 tons shipped in June a year ago.

June shipments brought the total

for the first six months of the year to 57,141 net tons.

Steel Bars . . .

Bar Prices, Page 192

Despite a slow decline in new ordering, bar production can't keep up with demand. Hot weather the past several weeks and long-delayed maintenance are keeping mill operations below capacity.

Consumers continue to press for quicker deliveries, although some buyers appear to have succeeded in building moderate inventories. Stocks generally are light and most consumers are seeking to pad their supplies during the summer months. Mills are watching the inventory situation more closely.

There appears to be no letup in hot-rolled carbon bar demand. Mills are not fully booked for fourth quarter, but they are declining to take all the tonnage offered.

Demand for cold-finished bars is not so strong as that for hot rolled. Cold-finishers are not operating at capacity and are pressing for new tonnage.

Alloy bar supply is not nearly so tight as carbon bars, both hot-rolled and cold-drawn.

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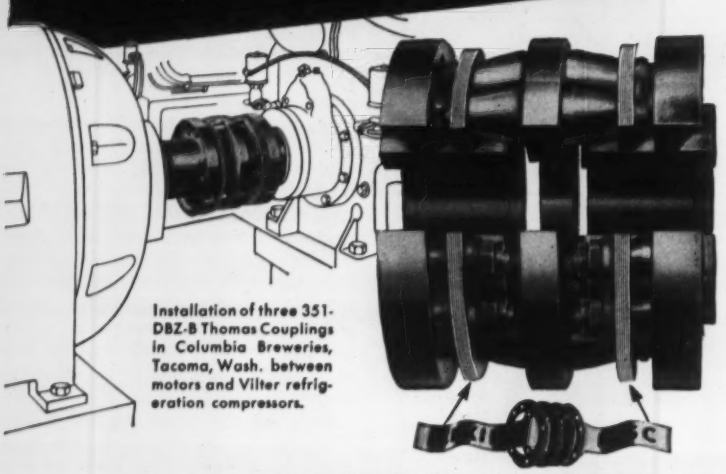

Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

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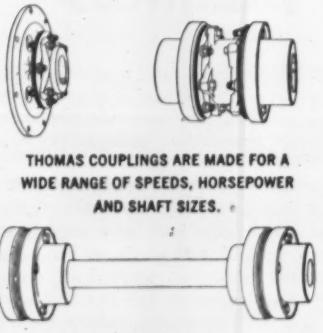

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Sheets, Strip . . .

Sheet & Strip Prices, Pages 193 & 194

With most sheetmakers out of the market on tonnage items for delivery the remainder of this year, they are facing increasing inquiry for first quarter requirements. Little tonnage is being accepted for that position, however, except for some specialties.

The mills haven't set up definite schedules for all of the fourth quarter. They have set-asides for regular customers (usually on a restricted basis), but they haven't received complete specifications in many cases. Only on some specialties, including stainless sheets, do they have any open capacity.

There is some narrow cold-rolled strip tonnage open for October-November shipment in New England. But there is nothing available in sheets. In fact, only in spots is any capacity open at all over the rest of the year in carbon, galvanized, electrical sheets and specialties.

Many consumers are asking for twice as much fourth quarter tonnage as they ordered in second and third quarters. Some of them are believed asking for more than they will require in the period. This explains the restricted fourth quarter allotments with at least one month's production of the period certain to be blanked out to care for overflow tonnage from third quarter. Some producers only now are clearing away the last of second quarter bookings.

Both producers and consumers misfired in their thinking with respect to automotive order cutbacks. Eventually, some cancellations may be received, thus easing market pressure, but no one seems to know when. For the balance of the year any cutbacks up to 20 per cent would probably not materially ease the supply stringency. Heavy buying by car builders, continued high construction and failure of many users to build inventories, in all likelihood would quickly take up any slack that might develop in backlogs.

Thousands of tons of galvanized corrugated culvert sheets are going into large diameter pipe for highways. Also, this has been a banner year for airconditioning. This latter consuming group may be in the market for sheets earlier than usual for next year's production program.

Stampers of auto parts, largely, have gone to production for 1956 model cars without a break in their schedules.

Price increases ranging from 2.5 cents to 4.25 cents per lb on stainless clad steel sheets, carbon base 20 per cent, f.o.b. New Castle, Ind., recently were effected by the Ingersoll Steel Division, Borg-Warner Corp.

U. S. Steel Products Division, U. S. Steel Corp., last week announced new prices on steel drums and pails representing an average increase of about 7.5 per cent.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 192

Concrete reinforcing bar prices are firmer in New England, but they do not entirely reflect the recent $7 per ton increase in mill base prices.

Order backlogs of most area distributors are heavy but include substantial bridge tonnage sold as low as $7 per 100 lb. Also, tonnage is backing up with turnpike volume under pressure for delivery.

Wire . . .

Wire Prices, Pages 194 & 195

Construction wire is selling well for applications in concrete reinforcement. Road and bridge-building projects in the Pittsburgh area are taking large quantities.

The generally high level of industrial activity assures a healthy demand for manufacturers wire for an indefinite period. This product is in considerably tighter supply than is normal for the summer season.

Wire rods are in strong demand. No consumers, however, are caught with short supplies of this item.

Only fine wire lags in accelerated buying of carbon grades in New England.

One Pittsburgh producer, formerly a factor in the New England market on both rods and finished wire, is again offering tonnage in that area, with a larger volume of finished carbon wire available.

Plates . . .

Plate Prices, Page 192

If anything, plate demand is more active than ever. Tank and heavy construction requirements, line pipe work and requirements for electrical machinery and heavy equipment show no letup, with inquiry being increased sharply by expanding railroad freight car needs.

Shipwork is showing more life and by late fall should be quite a market factor. Meanwhile, the warehouses are complaining of inability to get enough plates to maintain balanced inventories.

Producers are seeking to avoid further congestion in their schedules. Most eastern mills are not booking beyond October, and with large tonnage for railroad cars to be supplied, they are holding down accepted inquiries to a minimum.

New England plate fabricators, in all categories, are asking for more fourth quarter tonnage, but their inquiries are being cut down if the mills find any evidence of overestimating requirements.

Tubular Goods . . .

Tubular Goods Prices, Page 196

Pipe mill order books are reported filling at Pittsburgh. There is some slowness in welded tubing sales, but other products are generally strong.

Most producers opened their books for fourth quarter tonnage within the last couple weeks. Requests for tonnage indicate an active closing quarter.

Standard pipe orders are being taken. Demand is brisk, reflecting construction requirements.

Cast iron pipe continues in active demand as municipalities carry out expansion plans.

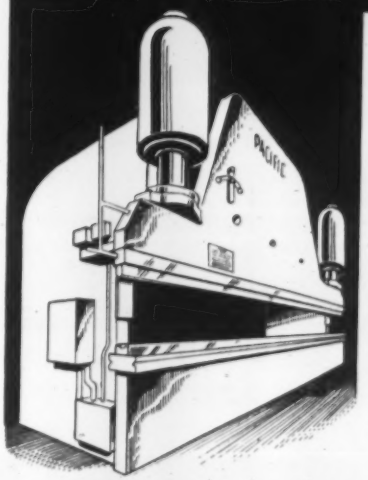
Steel Shipments Set Record

Shipments of finished steel products set a monthly record of 7,770,213 net tons in June, reports the American Iron & Steel Institute. The previous record was 7,540,889 tons in May.

Cold-rolled sheet shipments, at 1,292,282 tons, were higher than ever.

Shipments of line pipe increased

Versatility



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about 83,000 tons, compared with May. Standard pipe shipments were up about 19,000 tons. Plate shipments rose about 29,000 tons, galvanized sheets about 11,000.

Increases were made in rails, cold-finished bars, tool steel, mechanical and pressure tubing, wire and wire products, tin mill products and hot and cold-rolled strip steel.

Structural Shapes . . .

Structural Shape Prices, Page 192

Continued strong demand and increasing costs of raw material and labor are strengthening fabricated structural steel prices. Competition continues keen at most market points. Fabricating shops maintain conditions warrant higher prices than generally are being quoted.

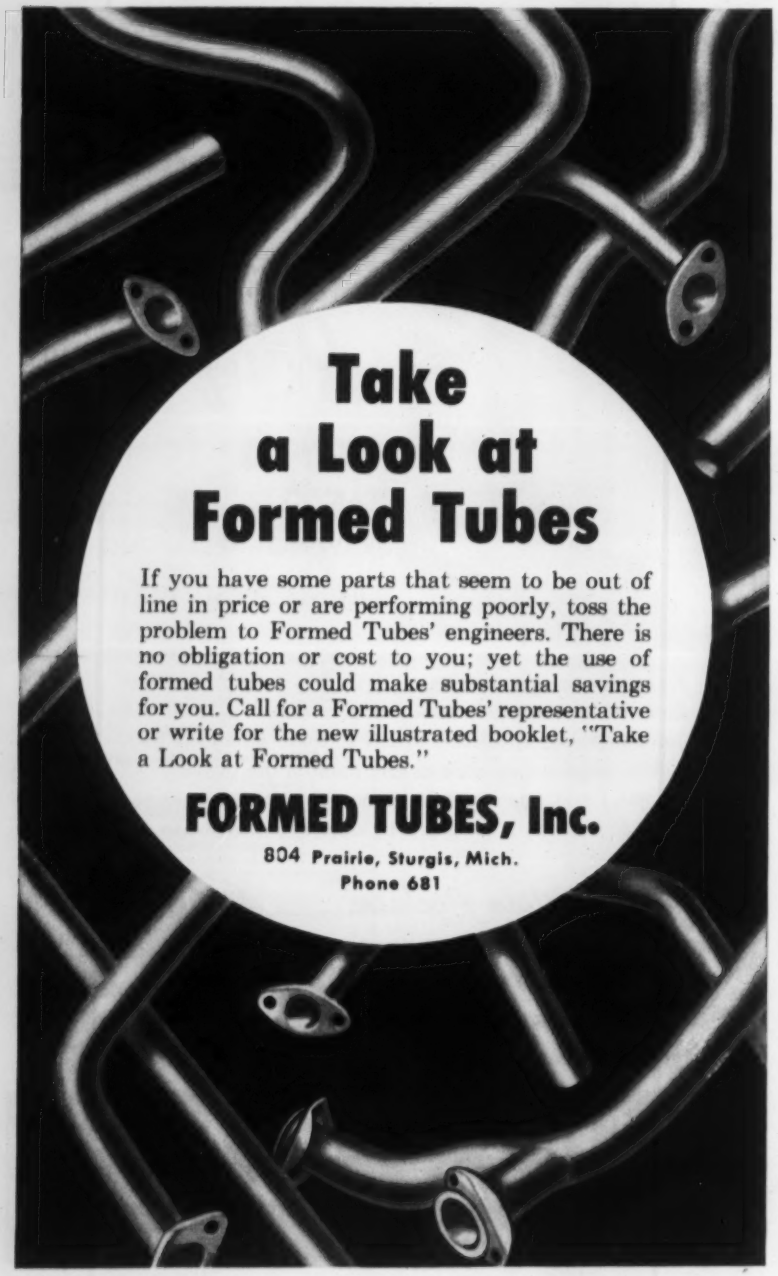
In the Philadelphia area, shops are dependent on one large eastern producer for a substantial volume of plain material and wide flange sections on which they are not covered. Tonnage offered for the fourth quarter would quickly fill mill schedules, but there appears reluctance on the part of makers to book full for the period.

Little structural material is coming to eastern fabricating shops from Pittsburgh, the largest producer at that point not equalizing freight. Some eastern area shops that earlier had dodged paying extra delivered costs.

Most eastern fabricators are into January and beyond on deliveries, but, at times, tonnage is still placed on a delivery basis. A recent project placed called for Nov. 1 shipment of tonnage.

New England fabricators need steel to meet firm contracts booked earlier this summer. Some district shops have been down because of strikes, however. Confronted with higher steel and labor costs, profit margins on substantial order backlogs are paper thin.

Plain material, as well as wide flange sections, will be in short supply through the fourth quarter. Shape producers at Pittsburgh predict the end of the old-fashioned seasonal slump in sales. They say unfilled orders will keep the mills busy well into the winter months. Buyers must spread ordering over a longer period.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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3400 tons, paper mill addition, Calhoun, Tenn., for Bowaters Southern Paper Corp., to Bristol Steel & Iron Works Inc., Bristol, Va. (This job was erroneously reported as involving only 2400 tons in the Aug. 1 issue).

1350 tons, Manhattan approachwork to third tube of Lincoln tunnel, New York, through Gull Contracting Co., Flushing, L. I., N. Y., general contractor, to Harris Structural Steel Co., New York.

950 tons, textile plant, J. P. Stevens & Co., Dublin, Ga., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Daniel Construction Co., Greenville, S. C., general contractor.

500 tons, transformer plant, General Electric Co., Hickory, N. C., to Ingalls Steel Construction Co., Birmingham; J. A. Jones Co., Charlotte, N. C., is general contractor; reinforcing bars to Easterby & Mumaw Inc., Charlotte, N. C.

500 tons, hangars and storage structures, Beaufort, S. C., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Henry C. Beck Co., Atlanta, is general contractor; reinforcing bars to Virginia Steel Co., Richmond, Va.

460 tons, Montana state, 698-ft Missouri river bridge, Phillips-Fergus counties, reported awarded to American Bridge Division, U. S. Steel Corp.; N. A. Nelson Co., Sheridan, Wyo., is general contractor.

370 tons, shop addition, Robbins Airfield Base, Ga., to Calvert Iron Works Inc., Atlanta; Southern Construction Co., Macon, Ga., general contractor.

300 tons, structurals and bars, student union building, University of Massachusetts, Amherst, Mass., to Topper & Griggs Inc. (Bethlehem Fabricators Inc.) and Fabricated Steel Products Co. (bars); D. A. Sullivan & Sons Inc., Northampton, Mass., general contractor.

250 tons, gymnasium and pool, teachers' college, Bridgewater, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Poorvu Construction Co. Inc., Boston, general contractor.

220 tons, library, University of Louisville, Louisville, to International Steel Co., Evansville, Ind.; Struck Construction Co., Louisville, general contractor.

200 tons, brewery cellar, Norristown, Pa., to Morris-Wheeler Co., Philadelphia, through H. A. Kuigian Co., contractor-engineer, Philadelphia.

200 tons, school building, South Hadley, Mass., to R. B. DeArnieu Co., Springfield; Agvadro & Cerruti, Inc., Northampton, Mass., general contractor.

195 tons, data processing center, Sylvania Electric Products Co., New York state, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

STRUCTURAL STEEL PENDING

2025 tons, three plant buildings, Johnson & Johnson, North Brunswick, N. J., Walter Kidde & Co., engineer and general contractor.

2000 tons, approximately, aviation trade school, Board of Education, Queens, New York; bids asked.

1000 tons, factory building, Kolmark Mfg. Co., Springfield Gardens, New York, bids asked.

990 tons, bridges, Pennsylvania turnpike, contract 27-2, Lackawanna county, bids Sept. 1, Harrisburg, Pa.

360 tons, bridges, Pennsylvania turnpike, contract 36-N, Lackawanna county, bids Sept. 1, Harrisburg, Pa.

315 tons, Oregon state, 565-ft bridge, Douglas county; bids to Portland, Oreg., Aug. 11.

150 tons, New Lots Library, Brooklyn, N. Y., bids asked.

135 tons, Oregon state traffic interchange, Multnomah county; bids to Portland, Oreg., Aug. 12.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2685 tons, 13 bridges and five box culverts, Massachusetts turnpike, Millbury - Auburn, Mass., to Bethlehem Steel Co.; J. C. Lungenfelder & Son Inc., Baltimore, general contractor.

900 tons, bars and piling, north approach miscellaneous work, tunnel, Central artery, Boston; bids Aug. 23, State Department of Public Works, Boston; 17,300 tons, tunnel frames awarded earlier to Bethlehem Steel Co., Bethlehem, Pa.

550 tons, aircraft defense facilities, Bridgeport, Conn., area, to Capitol Steel Co., New York; Frouge Construction Co., Bridgeport, general contractor.

380 tons, Washington Water Power Co., service center, Spokane, Wash., to Soule Steel Co., Portland, Oreg.

375 tons, concrete bridge deck, West Springfield-Chicopee, Mass., to U. S. Steel Supply Division, U. S. Steel Corp., Boston, through Daniel O'Connell's Sons Co. Inc., Holyoke, Mass., general contractor.

300 tons, addition, state hospital, Monson, Mass., to Fabricated Steel Products Co., Quincy, Mass.; M. I. Connor Co., Northampton, Mass., general contractor.

220 tons, library, University of Louisville, Louisville, to American Builders' Supply Co., Louisville; Struck Construction Co., Louisville, general contractor.

203 tons, 14 storage igloos, Elmendorf Air Base, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Baker & Ford, Bellingham, Wash., general contractor.

165 tons, gymnasium and pool, teachers' college, Bridgewater, Mass., to Concrete Steel Co., Boston; Poorvu Construction Co. Inc., Boston, general contractor.

155 tons, mostly bars, 30 tons, structurals, facilities, airfield base, Portsmouth, N. H., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Robert A. Verrier Construction Co., Portland, Me., general contractor.

150 tons, four cement silos, Olympic Cement storage Inc., Seattle, to Northwest Steel Rolling Mills Inc.; Kuney-Johnson Co., Seattle, general contractor, low at $239,812.

145 tons, hangar and miscellaneous facilities, naval air station, South Weymouth, Mass., to Concrete Steel Co., Boston; John A. Volpe Construction Co., Malden, Mass., general contractor.

125 tons, shop addition, Robbins Airfield Base, Ga., to Connors Steel Co., Birmingham; Southern Construction Co., Macon, Ga., general contractor.

115 tons, textile plant, J. P. Stevens Co., Dublin, Ga., to Ceco Steel Products Co., Atlanta; Daniel Construction Co., Greenville, S. C., general contractor.

PLATES . . .

PLATES PLACED

700 tons, tanks, aircraft fueling, airfield base, Portsmouth, N. H., to Massachusetts Engineering Co., Boston; Robert A. Verrier Construction Co., Portland, Me., general contractor.

PIPE . . .

CAST IRON PIPE PLACED

153 tons, system expansion, Aberdeen, Wash.; to Pacific States Cast Iron Pipe Co., Seattle.

STEEL PIPE PLACED

120 tons, aircraft fueling facilities, airfield base, Portsmouth, N. H., to Commercial Welding Co., Boston; Robert A. Verrier Construction Co., Portland, Me., general contractor.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Louisville & Nashville, 30 general-purpose diesel units; twenty 1600-hp units to American Locomotive Co., and ten 1750-hp units to Electro-Motive Division, General Motors Corp., LaGrange, Ill.

RAILROAD CARS PLACED

Central of Georgia, 500 boxcars to Pullman-Standard Car Mfg. Co., Chicago.

Fruit Growers Express Co., 400 seventy-ton mechanical refrigerator cars to its own shops at Alexandria, Va.

New York Transit Authority, 250 subway passenger cars to the St. Louis Car Co., St. Louis.

Savannah & Atlanta, 300 wide-door boxcars to the Pullman-Standard Car Mfg. Co., Chicago.

RAILROAD CARS PENDING

Alaska Railroad, 50 seventy-ton flat cars; bids to General Services Administration, Seattle, Aug. 26.

Erie, 500 boxcars.

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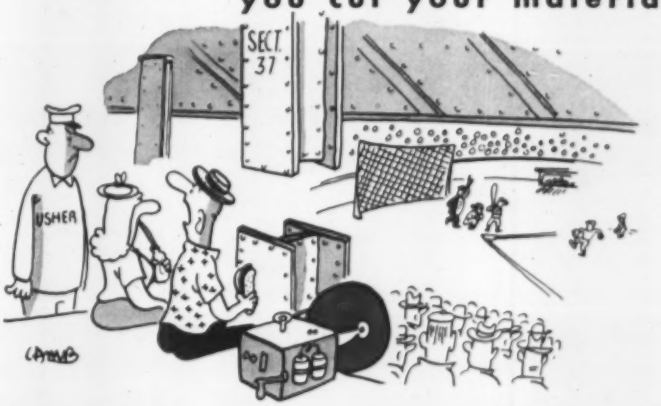

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MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.

(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.). Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max, 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, C 0.025% max. (Simplex 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered, Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carloads, packed 8 M x D, 18.35c per lb of alloy, ton lot 19.2c; less ton lot, 20.4c, delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.90c per pound of contained chromium plus 12.2c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50%, carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grades, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max) $3.10. **Primos and High Speed Grades** (V 50-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12c per lb of contained Si, carload packed 13.6c, ton lot 15.5c, less ton 16.7c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per pound contained silicon; carload packed 14.85c; ton lots, 16.05c; less ton, 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 46c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.05c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 11.85c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.45c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.55c per lb of briquet. Packed c.l. 7.55c, ton lot 8.35c, less ton 9.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.7c. Packaged c.l. 7.7c, ton lot 8.5c, less ton 9.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.80-$6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max.) Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, deld.; less ton lots $4.70.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carloads packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5.7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy, ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn. $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; Washington, Pa., $1.24.

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STEELWELD PRESSES

Caterpillar DW20 Tractor with W20 Wagon.

Tractor equipment parts produced on this and other Steelweld Presses at Caterpillar are of various thicknesses and require many different bends. This is a Model K5-10 Press rated at 320 tons.

THE ease and speed with which dies can be changed on Steelweld Presses and necessary adjustments made have proven a big asset in obtaining high production of a great variety of steel parts for scrapers, rippers, bulldozer blades and wagons at the Joliet Plant of Caterpillar Tractor Co.

Because of simplicity of Steelweld operation, the parts can be turned out quickly and accurately. The heavy quality construction, including solid one-piece frame, finest electrical equipment and automatic oilers for lubrication of all bearings, keep Steelweld Press maintenance extremely low and assure uninterrupted production.

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OTTAWA OSP INC STEEL PRODUCTS

Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% (spot)	24.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	*$33.50*
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 95c-$1.05 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 75c-80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African	
48% 2.8:1	*nom. $45.00-$50.00*
48% 3:1	42.00-44.00
48% no ratio	*34.00*
South African Transvaal	
44% no ratio	$19.00-$20.00
48% no ratio	*32.00*
Domestic	
Rail nearest seller	
18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

56-60%	*$3.50-$3.75*
60-65%	*3.75-3.90*

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills	
Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haideman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawston, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawston, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $125; Woodbridge, N. J., $122.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $194; Danville, Ill., $197.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $241; Danville, Ill., $244.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $286.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Bilmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ⅛-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	*$13.25-$14.00*
Connellsville, foundry	*16.00-17.00*
Oven Foundry Coke	
Kearny, N. J., ovens	*$25.50*
Camden, N. J., ovens	*25.00*
Everett, Mass. ovens	
New England, deld.	**27.05*
Chicago, ovens	25.75
Chicago, deld.	27.25
Terre Haute, Ind., ovens	25.50
Milwaukee, ovens	26.25
Indianapolis, ovens	25.50
Cincinnati, deld.	27.10
Painesville, O., ovens	26.25
Cleveland, deld.	28.18
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	*25.00*
Swedeland, Pa., ovens	*25.00*
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	*25.00*
Detroit, ovens	26.25
Detroit, deld.	27.25
Pontiac, deld.	27.81
Saginaw, deld.	29.33

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	32.00-35.00
Industrial xylol	32.00-35.00
Per ton, bulk, ovens	
Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol, 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32-$33; 60%, $28-$29. Imported, net tons, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam	Length	Per 100 lb
Inches		
2	24	$47.75
2½	30	30.75
3	40	30.00
4	40	28.50
5⅛	40	28.25
6	60	25.50
7	60	25.25
8, 9, 10	60	22.75
12	72	26.00
14	60	22.50
16	72	21.50
17	60	22.00
18	72	21.50
20	72	21.25
CARBON		
8	60	11.40
14, 12, 10	60	11.10
14	72	10.25
17	60	10.25
17	72	9.85
20	84	9.85
20	90	9.65
24	72, 84	9.85
24	96	9.60
30	84	9.75
40, 35	110	9.50
40	100	9.50

CASE HISTORY NO. 6—HARDENED WAYS

Courtesy—The Ohio Knife Company

Grinds extra-fine finish on hardened ways

...holds ±.0002" tolerance!

Fine micro finish is produced on these hardened machine ways, and accuracy is held to ± .0002", *or better*, finish grinding on the Mattison High-Powered Precision Surface Grinder. Ways are SAE 52100, hardened to 64-66 Rockwell, C scale, and measure 107" x 4-1/2" x 1-15/16". They are ground at profit-boosting speed . . . several pieces per load.

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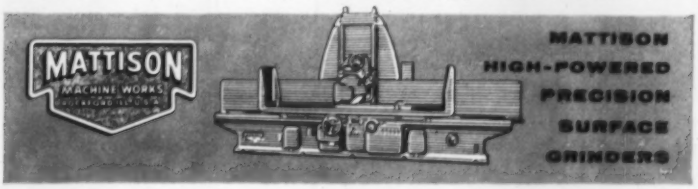

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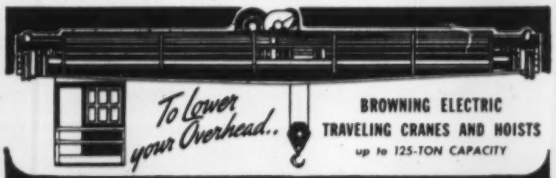

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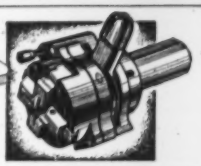

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Scrap . . .

Scrap Prices, Page 210

Pittsburgh—A mill on the outskirts of the Pittsburgh district bought No. 1 heavy melting scrap for $45.50 last week; a price equivalent to $45 a ton delivered to a Pittsburgh mill. High export requirements for scrap and near-capacity steel operations force higher prices on almost all grades.

Cleveland—Mill demand for scrap is absent here and in the Valley, but prices are holding unchanged at the higher levels established a week ago. Indications are a peak has been reached, at least for the moment.

Cincinnati—The local market is poised uneasily on a price peak. So far no action has developed to move prices down.

Boston—Stronger steel scrap prices here are based on domestic buying, notably by eastern Pennsylvania melters, with exports a minor factor.

New York—Steel scrap grades are stronger, prices being up $2 per ton in some cases. Both heavy and light grades of industrial steel share in the increase, with brokers paying $39-$40 for No. 1 heavy melting. Short shoveling turnings are up $2. Cast iron grades are mostly unchanged with a slight advance, about $1 a ton, reported on No. 1 cupola.

Buffalo—Scrap prices are firm at the recently advanced levels. Support to the market is provided by outdistrict buying.

Philadelphia—Scrap prices are higher, with most eastern Pennsylvania mills buying. All grades are strong, including malleable and drop broken machinery. Domestic prices on steel grades usually top export bids.

Detroit—The scrap market continues strong here. Supply is not keeping pace with demand. Prices continue to point higher.

Chicago—The scrap market here is a little less active than it has been for several weeks. Two factors seem to be at work. Hot weather has kept steel production below projected schedules (in the week ended Aug. 7, it was four points lower); and some larger consumers are restricting purchases, living off substantial inventories.

Washington—Consumption of ferrous materials (scrap and pig iron) during June decreased 5 per cent from May, with daily consumption off 1 per cent, reports the Bureau of Mines. Consumption of scrap totaled 6,102,000 gross tons, 5 per cent less than in May while pig iron consumption, 5,787,000 tons, decreased 4 per cent.

The total melt (11,889,000 tons) consisted of 51.3 per cent scrap and 48.7 per cent pig iron during June. This compares with 51.5 per cent scrap and 48.5 per cent pig iron in May.

Stocks of ferrous scrap held by consumers totaled 6,407,000 gross tons at the end of June, a slight drop from the end of May when they were 6,481,000 tons.

St. Louis—The small but diversified list offered by the Kansas, Missouri & Texas Railroad has boosted railroad scrap prices again. Rail demand continues strong, with supplies scarce. Melting steel prices are steady.

Birmingham—High prices paid by northern mills are attracting scrap from the South. This is particularly true of No. 2 bundles, which had been piling up in southern yards for several months.

Los Angeles—Dealers' sales for the second quarter were 5 to 10 per cent above the national average and at least 15 per cent above sales in the like period a year ago.

San Francisco—Exporters are paying more than going mill prices for steel scrap, so great is their anxiety to obtain desired tonnage.

Seattle—The scrap market continues active. Receipts are heavy and prices firm. Prices on electric furnace material are strong, advancing to a range of $42-$44. Country collections are large, prevailing prices proving attractive. Export influences are giving the entire market situation a stronger aspect.

Alloy Steel . . .

Production of stainless and heat resistant steel ingots totaled 300,024 net tons in the second quarter this year, reports the American Iron & Steel Institute. This compares with output of 290,646 tons in the first quarter and 183,702 tons in the second quarter of 1954.

Output in the first six months this year was 590,921 net tons.

(*Please turn to page* 212)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 10	$44.17
Aug. 3	43.17
July Avg.	39.67
Aug. 1954	28.80
Aug. 1950	40.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer's plant)

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 bundles	*44.00-45.00*
No. 2 bundles	*37.00-38.00*
No. 1 busheling	*44.00-45.00*
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	*23.00-24.00*
Short shovel turnings	*28.00-29.00*
Cast iron borings	*28.00-29.00*
Cut structurals, 3 ft lengths	*45.00-46.00*
Heavy turnings	*41.00-42.00*
Punchings & plate scrap	*45.00-46.00*
Electric furnace bundles	*44.00-45.00*

Cast Iron Grades

No. 1 cupola	40.00-41.00
Charging box cast	35.00-36.00
Heavy breakable cast	35.00-36.00
Unstripped motor blocks	25.00-26.00
No. 1 machinery cast	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	*45.00-46.00*
Rails, 2 ft and under	*51.00-52.00*
Rails, 18 in. and under	*52.00-53.00*
Rails, random lengths	*48.00-49.00*
Railroad specialties	*50.00-51.00*

Stainless Steel Scrap

18-8 bundles & solids	255.00-265.00
18-8 turnings	110.00-120.00
430 bundles & solids	100.00-105.00
430 turnings	60.00-65.00

*Brokers' buying price

CLEVELAND

(Delivered consumers's plant)

No. 1 heavy melting	43.50-44.50
No. 2 heavy melting	32.00-33.00
No. 1 bundles	43.50-44.50
No. 2 bundles	29.00-30.00
No. 1 busheling	43.50-44.50
Machine shop turnings	23.00-24.00
Mixed borings, turnings	27.00-28.00
Short shovel turnings	27.00-28.00
Cast iron borings	27.00-28.00
Low phos.	45.00-46.00
Cut structural plates 2 ft and under	48.00-49.00
Alloy free, short shovel turnings	31.00-32.00
Electric furnace bundles	43.50-44.50

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	40.00-41.00
Stove plate	46.00-47.00
Heavy breakable cast	37.00-38.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	48.00-49.00
Burnt cast	37.00-38.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	50.00-51.00
Rails, 2 ft and under	53.00-54.00
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	48.00-49.00
Cast steel	43.00-44.00
Railroad specialties	50.00-51.00
Uncut tires	46.00-47.00
Angles, splice bars	51.00-52.00
Rails, rerolling	57.00-58.00

Stainless Steel

(Brokers' buying pricese; f.o.b. shipping point)

18-8 bundles, solids	250.00-260.00
18-8 turnings	120.00-130.00
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer's plant)

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	46.00-47.00
No. 2 bundles	32.00-33.00
No. 1 busheling	46.00-47.00
Machine shop turnings	24.00-25.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	46.00-47.00
Electric furnace bundles	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00

CHICAGO

No. 1 heavy melting	41.00-43.00
No. 2 heavy melting	36.00-37.00
No. 1 factory bundles	43.00-44.00
No. 1 dealer bundles	40.00-41.00
No. 2 bundles	31.00-32.00
No. 1 busheling	41.00-43.00
Machine shop turnings	27.00-28.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals, 3 ft	44.00-45.00
Punchings & plate scrap	45.00-46.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	*38.00-39.00*
Unstripped motor blocks	32.00-33.00
Clean auto cast	49.00-50.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00
R.R. malleable	51.00-52.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Angles, splice bars	53.00-54.00
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	255.00-265.00
18-8 turnings	130.00-140.00
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

Chicago Mercantile Exchange

(Week ended Aug. 10)

	High	Low	Close
No. 1 Heavy Melting			
	High	Low	Close
Oct.	....	....	39.00*
Jan.	....	....	....

Sales (160-ton units): None.
*Nominal.

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	39.00
No. 2 heavy melting	*29.00*
No. 1 bundles	39.00
No. 2 bundles	27.00
No. 1 busheling	39.00
Machine shop turnings	*20.00*
Mixed borings, turnings	*20.00*
Short shovel turnings	*22.00*
Punchings & plate scrap	*43.00*

Cast Iron Grades

Charging box cast	32.00
No. 1 cupola	39.00
Stove plate	32.00
Heavy breakable	32.00
Unstripped motor blocks	22.00
Clean auto cast	42.00
Malleable	35.00

BIRMINGHAM

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	31.00-32.00
No. 2 bundles	23.00-24.00
No. 1 busheling	32.00-33.00
Cast iron borings	15.00-16.00
Short shovel turnings	24.00-25.00
Machine shop turnings	18.00-19.00
Electric furnace bundles	32.00-33.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate	*39.00-40.00*
Structural plate, 2 ft	*38.00-39.00*
Unstripped motor blocks	35.50-36.50

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 2 ft and under	44.00-45.00
Rails, 18 in. and under	48.00-49.00
Rails, rerolling	51.00-52.00
Rails, random lengths	*44.00-45.00*
Angles, splice bars	43.00-44.00
Std. steel axles	35.00-36.00

PHILADELPHIA

(Delivered consumer's plant)

No. 1 heavy melting	*46.00*
No. 2 heavy melting	*40.00*
No. 1 bundles	*46.00*
No. 2 bundles	*36.00-37.00*
No. 1 busheling	*46.00*
Electric furnace bundles	45.00-46.00
Machine shop turnings	*28.00-28.50*
Mixed borings, turnings	*27.00-28.00*
Short shovel turnings	*30.50-31.00*
Structurals & plate	*48.00*
Heavy turnings	40.00-41.00
Couplers, springs, wheels	*48.00*
Rail crops, 2 ft under	*54.00*

Cast Iron Grades

No. 1 cupola	36.00-38.50
Malleable	*48.50-49.00*
Heavy breakable cast	*44.00-44.50*
Drop broken machinery	*46.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	*39.00-40.00*
No. 2 bundles	*28.00-29.00*
Machine shop turnings	*19.00-20.00*
Mixed borings, turnings	*19.50-20.00*
Short shovel turnings	*21.50-23.00*
Low phos. (structural & plate)	*42.00*

Cast Iron Grades

No. 1 cupola	*33.00-34.00*
Unstripped motor blocks	24.00-25.00
Heavy breakable	36.00-37.00

Stainless Steel

18-8 sheets, clips, solids	265.00-270.00
18-8 borings, turnings	135.00-140.00
430 sheets, clips, solids	115.00-120.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-35.50
No. 2 heavy melting	28.00-28.50
No. 1 bundles	35.00-35.50
No. 2 bundles	25.00-25.50
Machine shop turnings	16.50-17.50
Mixed borings, turnings	15.50-16.50
Short shovel turnings	20.00-21.00
No. 1 cast	30.00-31.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	33.00-34.00

BUFFALO

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	39.00-40.00
No. 2 bundles	31.00-32.00
No. 1 busheling	39.00-40.00
Mixed borings, turnings	28.00-29.00
Machine shop turnings	26.00-27.00
Short shovel turnings	29.00-30.00
Cast iron borings	28.00-29.00
Low phos.	*43.00-44.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	*44.00-45.00*
Rails, 2 ft and under	*47.00-48.00*
Railroad specialties	*48.00-49.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	41.50-42.50
No. 2 heavy melting	35.50-36.50
No. 1 bundles	41.50-42.50
No. 2 bundles	34.50-35.00
No. 1 busheling	41.50-42.50
Machine shop turnings	27.00-28.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings	32.00-33.00
Cast iron borings	24.00-25.00
Low phos., 18 in.	43.00-44.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast	38.00-39.00
Charging box cast	38.00-39.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt	44.00†
Rails, 18 in. and under	51.00-52.00
Rails, random lengths	44.00-45.00

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	36.50
No. 2 heavy melting	34.00
No. 1 bundles	36.50
No. 2 bundles	29.50
Machine shop turnings	25.00
Short shovel turnings	27.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	35.00
Heavy breakable cast	35.00
Unstripped motor blocks	35.00
Brake shoes	*36.00*
Clean auto cast	45.00
Stove plate	37.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00
Rails, 18 in. and under	*52.00*
Rails, random lengths	*48.00*
Rails, rerolling	*61.00*
Angles, splice bars	49.00

SEATTLE

(Delivered consumer's plant)

No. 1 heavy melting	33.00
No. 2 heavy melting	29.00
No. 1 bundles	28.00
No. 2 bundles	23.00
No. 3 bundles	19.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	*42.00-44.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*38.00*
Heavy breakable cast	30.00
Unstripped motor blocks	29.00
No. 1 wheels	30.00-33.00
Stove plate (f.o.b. plant)	25.00
Brake shoes	28.00-29.00

Railroad Scrap

(Delivered consumer's plant)

Rails, random lengths	33.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	32.00
No. 2 bundles	25.00
Machine shop turnings	10.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00-45.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	32.00
No. 2 bundles	27.00
No. 1 busheling	32.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	14.00
Cast iron borings	14.00
Cut structurals	34.00
Heavy turnings	12.00
Punchings & plate scrap	32.00

Cast Iron Grades

No. 1 cupola	45.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	*38.50*
No. 2 heavy melting	*35.50*
No. 1 bundles	*38.50*
No. 2 bundles	*32.50*
Mixed steel scrap	*32.50*
Mixed borings, turnings	*17.00*
Rails, remelting	*47.50*
Busheling, new factory:	
Prepared	*36.50*
Unprepared	*32.50*
Short steel turnings	*21.00*

Cast Iron Gradest

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

LOGEMANN Metal Balers

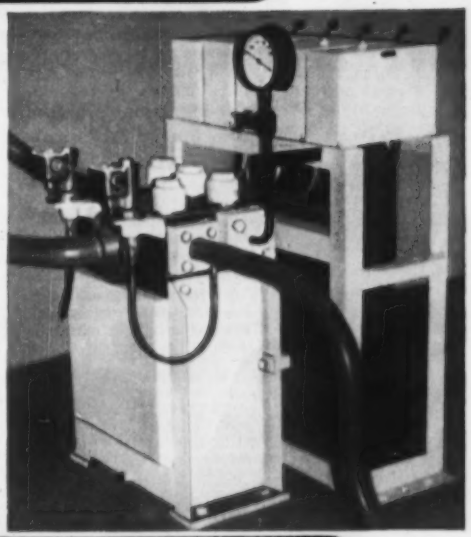
. . . powerful . . . compact . . . capable of high tonnage output!

In the large stamping plants and rolling mills where it is critically important that trim and stamping skeletons are quickly disposed of to avoid interference with production, LOGEMANN metal balers are relied on to keep ahead of production and pack such scrap into high density, self-cohering bricks for re-melting.

Hundreds of installations have established new records for tonnage, minimum maintenance, reliability, over extended periods of uninterrupted operation at high-speed.

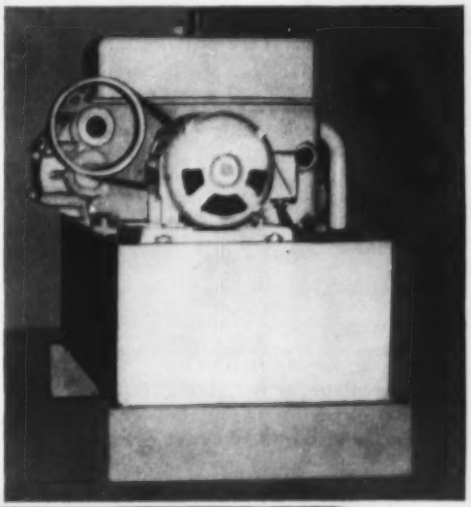
LOGEMANN models are not confined to the large sizes. Many small plants have found it profitable to use smaller sizes embodying the same features of reliability, at minimum operating cost. Interested parties are invited to write for details. Information as to the character of the scrap, tonnage to be handled in a given period of hours, and range of gauges is helpful in determining the proper model.

LOGEMANN



HYDRAULIC VALVES

The illustration shows a close-coupled hydraulic valve, operated by compressed-air cylinders for high-speed distribution of large gallonage of fluid at high pressure. LOGEMANN engineers have designed and built valves for many unusual as well as standard applications, and will welcome inquiries, with an outline of the conditions and requirements.



HYDRAULIC PUMPS

The opposed-cylinder close-coupled double pressure pump shown in the illustration is mounted on an individual tank to conserve floor space under present crowded plant and operating conditions. When requesting details, please indicate the nature of the service, pressure and gallonage requirements, and the fluid to be handled.

LOGEMANN BROTHERS CO.

3126 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

PUNCHES·DIES

RIVET SETS · COMPRESSION RIVETER DIES

Made of highest standards and uniform quality thus insuring maximum service.

Since 1903

Large inventory of stock sizes of round punches and dies—also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.

Write Dept. A for New Catalog 54

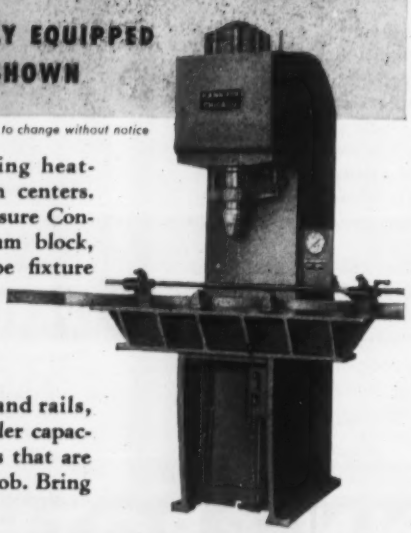
GEO. F. MARCHANT COMPANY

1420-34 So. ROCKWELL STREET CHICAGO 8, ILLINOIS

This 25-TON Hannifin Straightening Press Sells For

$4,179 FULLY EQUIPPED AS SHOWN

Price F.O.B. our press plant at St. Marys, Ohio, subject to change without notice



The ideal press for straightening heat-treated parts up to 60" between centers. Exclusive Hannifin Sensitive Pressure Control for speed and accuracy. Ram block, two table blocks and center-type fixture complete with rails included.

STRAIGHTENING PRESSES FROM 5 TO 150 TONS

Hannifin offers longer tables and rails, roller-type fixtures, larger or smaller capacities (5 to 150 tons)—all at prices that are easily justified by savings on the job. Bring us your straightening problems.

HANNIFIN

HANNIFIN CORPORATION, 523 S. WOLF ROAD, DES PLAINES, ILLINOIS

Warehouse . . .

Warehouse Prices, Page 197

Sales of steel warehouses in the first six months this year were up about 37 per cent over those in the like period of 1954. The improvement was not uniform. Business in the Atlantic Coast area was up 26 per cent; the Great Lakes states, 45; Mid-Continent, 33; the South, 31; and the Pacific Coast, 29.

June order volume bettered that of May from 4 to 10 per cent, depending upon the district. Demand was unusually strong from automotive consumers.

Reflecting the improved demand, warehouse stocks are down to about four months.

Semifinished Steel . . .

Semifinished Prices, Page 192

Reactivation of its blooming and bar mill at Wilder, Ky., is planned by Newport Steel Corp. as the result of the increased demand for steel. The facility, now undergoing extensive reconditioning, is expected to be ready for operation by Oct. 1. It will produce sheet bar and plates. The mill has been down since early 1954.

Failure to produce steel up to projected schedules is concerning producers in the Chicago area. For nine consecutive weeks, the district rate has fallen below expectations ingotwise. Rolling mill operations have been adversely affected.

Iron Ore . . .

Iron Ore Prices, Page 206

Market on foreign iron ores and manganese ore is strong, reflecting higher ocean rates and particularly heavy demand from European steelmaking countries. Prices on leading grades of foreign iron ore delivered here are unchanged but strong. High grade manganese ore, 48 per cent, for nearby delivery, is higher at 95c to $1.05 per long ton unit, c.i.f. U.S. ports, duty for buyer's account. Lower grades are unchanged.

Pig Iron . . .

Pig Iron Prices, Page 197

Pig iron sellers anticipate a better movement of tonnage this month than in July, when the vacation season was at its peak. Further gains are anticipated by sellers after Labor Day.

Allowing for vacations and hot weather, business this summer has held up better than usual. Some slackening in foundry buying was felt as summer opened, but the slump was much less severe than usual.

ASSISTANT SUPERINTENDENT

Wanted For

TWO BLAST FURNACE OPERATIONS

28½ feet, and 18½ feet

For details write or wire stating your personal qualifications and experience.

DETROIT STEEL CORPORATION
Personnel Department
Box 371
Portsmouth, Ohio

SUPERINTENDENT WANTED

For jobbing steel foundry, castings up to 12 tons. Must be experienced in all phases of steel foundry operation. Midwest location.

Reply Box 294, STEEL
Penton Building Cleveland 13, Ohio

CLASSIFIED

Representatives Wanted

MANUFACTURERS REPRESENTATIVE INDUCTION HEATING, well known and nationally advertised low and high frequency line. Should have proper contacts and experience to sell this type of equipment. Prefer organizations with other electric heating lines. Territories available: New England—New York—Philadelphia, Baltimore—Cincinnati, Louisville—St. Louis, Kansas City—West Coast. Reply Box 291, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

PLANT AND PRODUCTION MANAGER, Engineering Graduate (M.I.T.) indoctrinated in practical operating experience. Proven record of accomplishment in efficient plant supervision, control, and cost reduction coupled with amicable labor relations. Reply Box 257, STEEL, Penton Building, Cleveland 13, Ohio.

SALES—ASSISTANT OR TRAINEE—six years active experience hot rolled carbon mill products—domestic and foreign sales—able, imaginative, ambitious—best references—college—Reply Box 295, STEEL, Penton Building, Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS $5,000 to $35,000. We offer the original personal employment service (established 45 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC., 665 Brisbane Bldg., Buffalo 3, N.Y.

Material Wanted

Rejects or defectives, black annealed sheets will buy for export 500 tons, 24-30 GA or nearest, 6 by 2 feet and over. Also 200 tons galvanized plain sheets similar to above. Reply Box 296, STEEL, Penton Building, Cleveland 13, Ohio.

WANTED

36 USED WIDE FLANGE BEAMS

24" x 120# PER FOOT—60' LENGTHS

HIGGINS, INC.
Box 8001
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RAILWAY EQUIPMENT

FOR SALE

Used — As Is — Reconditioned

RAILWAY CARS—ALL TYPES

"SERVICE-TESTED"

FREIGHT CAR REPAIR PARTS

For All Types of Cars

LOCOMOTIVES

Diesel, Steam, Gasoline
Diesel-Electric

RAILWAY TANK CARS

STORAGE TANKS

6,000—8,000 and 10,000-Gallon
Cleaned and Tested

CRANES

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RAILS

New or Relaying

IRON & STEEL PRODUCTS, INC.

General Office
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Chicago 33, Illinois
Phone: MItchell 6-1212

New York Office
50-d Church Street
New York 7, New York
Phone: BEekman 3-8230

"*ANYTHING* containing IRON or STEEL"

FOR SALE

One Draw Bench, about 30,000-pound pull single chain, 1¾" diameter of chain pin—has simple push-in attachment and many dies for Hex, Round, etc., to 2", 40 h.p. 220/440 volt A.C. 3 phase motor. Capacity: 24 feet long, 20 feet per minute.

One 1" Shuster Two Plane Roll Type Shape Straightener and Cut-off Machine Model A-1, new 1924, 30 h.p. 440 volt A.C. 3 phase motor. Capacity: 1" hex, square and round x 12', includes numerous rolls and shear tools.

One R-14 Seneca Falls Lo-Swing Automatic Lathe, 30 h.p. 220/440 volt A.C. 3 phase motor.

For sale by owner. Contact:
V. A. Spoehr
The H. M. Harper Company
Morton Grove, Illinois
'PHONE: Orchard 3-1321

1500 TON FORGING PRESS

H.P.M. 1500 Ton down moving Forging or Hobbing Press, 48 x 48" Platen Area, 12" Stroke, 29" Daylight, 30" Moving Table, 40" Diameter Ram for 2500 PSI with complete Pumping Unit and 100 HP Motor. Good Condition.

STEWART BOLLING & COMPANY, INC.
3190 East 65th Street
Cleveland 27, Ohio
MIchigan 1-2850

WANTED—SURPLUS ROD & BAR

Stainless-Aluminum-Steel-Brass
Any size; type and quantity. Cash for termination inventories.
Send lists to:
COLLINS ENGINEERING COMPANY
9050 Washington Blvd.
Culver City, California

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PERMANENT OPPORTUNITIES

At our Cleveland, Ohio, Offices with an engineering firm having over 50 years of successful operation doing business all over the world.

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ARTHUR G. McKEE & CO.
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MACHINERY FOR SALE

24 spindle Natco Drill Press, Model C-13, Serial No. 1199, new in 1950 and used only as standby equipment. Good as new condition. Automatic head feed with 2 spindle speeds and 12 feeding speeds, equipped with #2MT spindles and shoes and 7½ H.P., 220-440 volt, 3-phase motor. See it under power at our plant.

WELLS ALUMINUM PRODUCTS CO.
DIV. OF WELLS SPECIALTY CO., INC.
NORTH LIBERTY, INDIANA

10 to 12 ft. lengths
ALL METALS
Also Screw Machine Products to Order
EASTERN
Machine Screw Corp.
New Haven, Conn.
Makers of H & G Die Heads

YOUR BEST *Tip* IN CARTS

No. 119
Sterling
HEAVY-DUTY CART

If you're looking for a good tip for wheeling coal, scrap, chips, turnings or similar heavy materials, see these Sterling Heavy Duty Carts. Over and over again the "3-Point Landing" feature of this well-balanced cart will convince you it's the best buy for years of service. Can be furnished with pneumatics, as shown, or steel wheels . . . plain or roller bearings. Write for Catalog.

3 SIZES AVAILABLE:

No. 119..... 7½ cu. ft.
No. 120..... 9 cu. ft.
No. 121..... 11¼ cu. ft.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

A HALF CENTURY OF PROGRESS

Sterling
WHEELBARROWS

Look for this Mark of STERLING Quality

SAVE $155 PER TON with *MicroRold*® Stainless Steel

7¾c Per Lb. Price Differential Between Types 430 and 302 Results In This Substantial Savings

By specifying MicroRold Type 430 stainless steel for suitable applications, stainless steel buyers can take advantage of the 7⅜c per pound difference in price between Type 430 and Type 302 stainless. A saving of $155 per ton merits consideration. Type 430 is a straight chromium-stainless with a nominal composition of 17% Chromium. During the Korean conflict, Type 430 was used extensively, due to government restriction on nickel-bearing stainless.

WIDE USE FOR TYPE 430

While Type 430 does not possess the same degree of corrosion resistance as Type 302, it has proven very satisfactory in a wide range of mild corrosion applications, both interior and exterior. It lends itself to a multitude of decorative and functional uses combining all the advantages and qualities of stainless steel—beauty, strength, corrosion resistance, long life, workability and ease of maintenance. Considering the price advantage, with no sacrifice in quality when applied properly, stainless steel buyers will find MicroRold Type 430 a worthwhile material for an impressive number of stainless steel applications.

Washington Steel
Corporation
WASHINGTON PENNSYLVANIA

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UPSON-WALTON
wire rope

You select

the wire rope best suited to your job from Upson-Walton's wide range of sizes and constructions ...factory-assembled slings also available.

You order

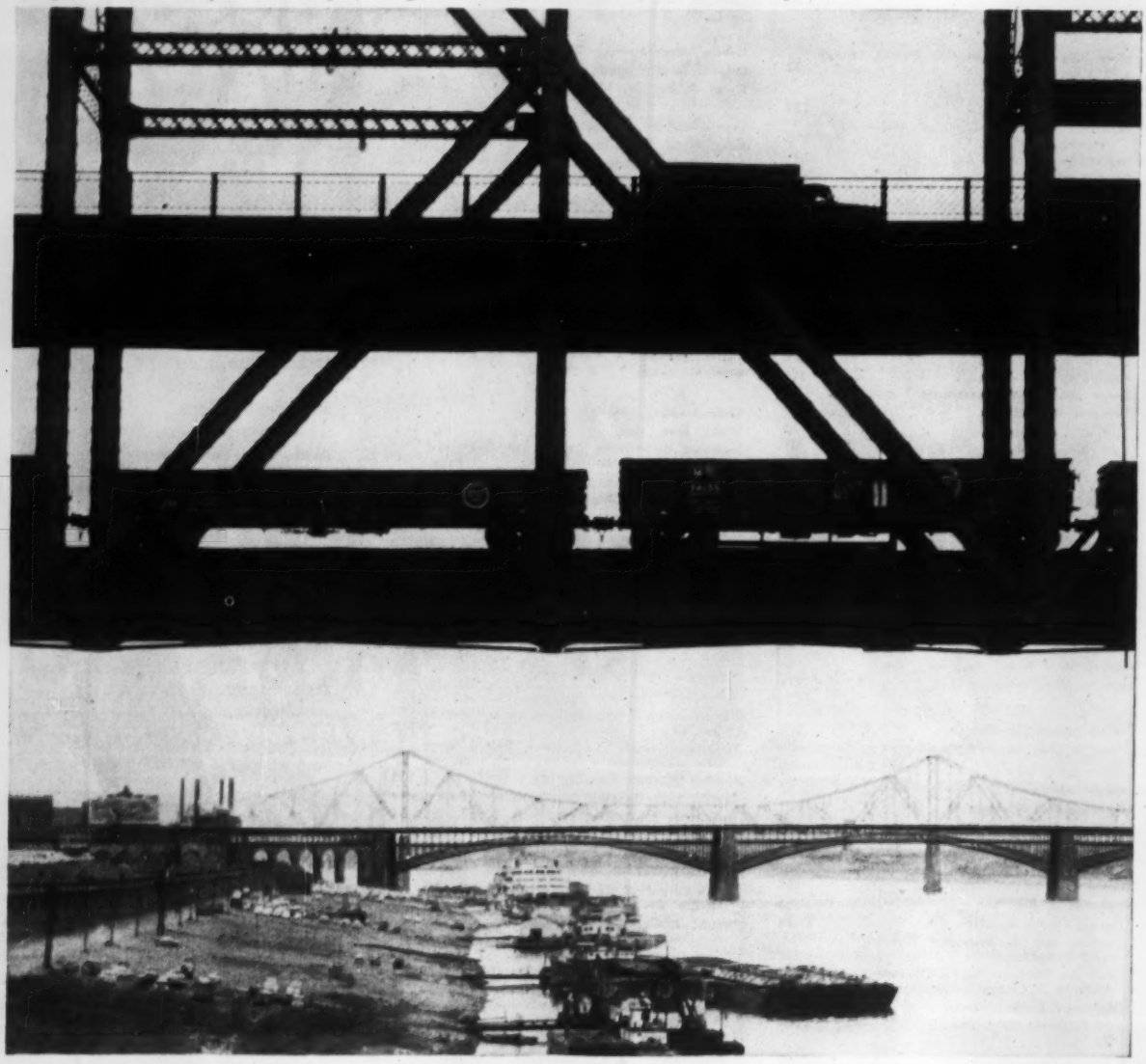
from nearby U-W distributors, who offer fast service from local stocks.

You get

long service from U-W wire rope ... it's a feature built in by U-W craftsmanship and high quality standards.

THE UPSON-WALTON COMPANY
12500 ELMWOOD AVE. • CLEVELAND 11, OHIO
New York • Chicago • Pittsburgh
MANUFACTURERS OF
WIRE ROPE, ROPE FITTINGS, TACKLE BLOCKS
ESTABLISHED 1871

Why Granite City Steel is growing 3 times faster than the industry!



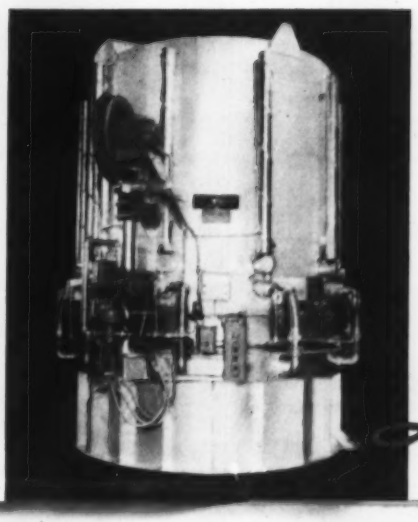
Close to customers . . . by truck, rail, barge

From its modern mill near St. Louis, Granite City Steel moves sheet steel to customers by truck, by rail, by barge. This 3-way choice of carriers guarantees prompter, faster delivery to steel buyers in Middle America.

Granite City Steel is located at the gateway to the West and Southwest, at the center of a network of highway, rail and waterway routes that also provide fast shipping lanes to the North and South. The *only* mill in this area offering you 77 years of specialization in quality flat-rolled steel and "next door neighbor" shipping speed, Granite City Steel is your *logical* source of sheet steel in Middle America. Sales offices in St. Louis, Kansas City, Minneapolis, Memphis, Dallas, Houston, Tulsa.

GRANITE CITY STEEL COMPANY
Granite City, Illinois
GRANCO STEEL PRODUCTS CO.
A subsidiary of Granite City Steel Co.

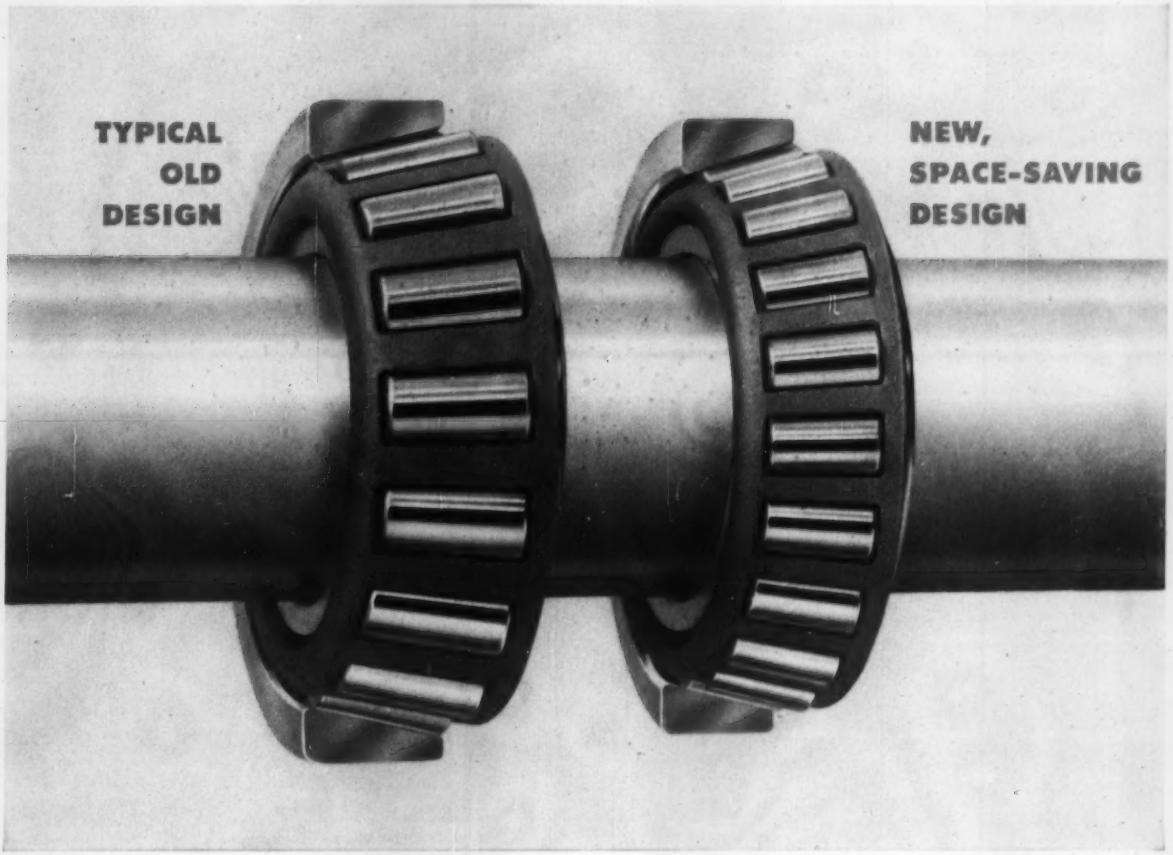
We tamed a torrid tornado to bring you better Annealing



Torrid heats swirling at speeds of more than a mile a minute—that's the **tornado type** heating that makes the new Lee Wilson High Convection Annealing Furnaces the fastest, most efficient units of their kind available today.
They get to heat fast, completely saturating the entire charge with an evenness that assures perfect uniformity of anneal.
The result of years of experience by the originators and leading producers of radiant tube, single-stack annealing systems, these new furnaces represent the most advanced strip coil annealing equipment marketed today.
Get all the facts and you'll get Lee Wilson—brochures and data sheets available upon request.

Lee Wilson ENGINEERING COMPANY-INC.
20005 WEST LAKE ROAD • CLEVELAND, OHIO

New capacity-packed TIMKEN® bearings save space and weight, cost less than previous bearings of same bore sizes



HERE'S big cost-saving news if you use bearings in ¾", 1¼" or 1⅜" bore sizes.

The Timken Company has designed three new tapered roller bearings that take up less space, weigh less than previous bearing designs and cost less! They're packed with capacity, too — no bearings have ever delivered so much capacity in so little space.

If you now use tapered roller bearings of these bore sizes you can enjoy big savings two ways by redesigning for the new Timken® bearings: savings in bearing cost and, because the bearings are smaller, savings in related parts.

The new Timken bearings also make it possible for you to enjoy the advantages of tapered roller bearings in many additional applications—and at minimum cost.

In less than a year, industry has already designed well over 1,000,000 of the new Timken bearings into its products. Why not re-examine your bearing applications today to see if you, too, can reduce the manufacturing cost of your products, or improve their performance, or both, by adopting the new low-cost Timken bearings. Bearings and all auxiliary parts are immediately available. Write: The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN® ... your number 1 bearing **VALUE**

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◯ AND THRUST ◯→ LOADS OR ANY COMBINATION ✳